# Telephony.

AN ILLUSTRATED MONTHLY TELEPHONE JOURNAL

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## Seventh Annual Convention of the Independent Telephone Association of the United States of America.

The seventh annual convention of the Independent Telephone Association of the United States of America was held on June 24 and 25 at the Auditorium Hotel, Chicago. The attendance, while not as large as had been expected, was better than at any convention of the National since 1897.

The convention was called to order at 2 p. m. Wednesday, June 24, by President James M. Thomas, who delivered his annual address, which was listened to attentively and elicited warm applause. It follows in full:

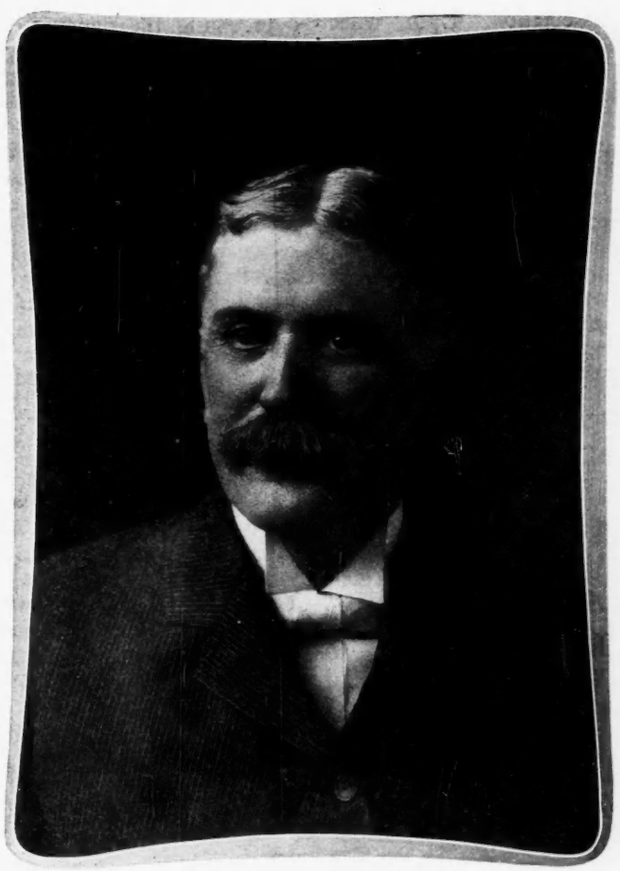
PRESIDENT THOMAS' ANNUAL ADDRESS.

There is no time when the worker is so happy as when his task is complete. If he has the consciousness of knowing that his efforts have met with success, it is glory enough. After all, we only really enjoy that which within ourselves we know to be the result of honest endeavor.

Since the very first meeting held by Independent telephone investors and promoters, my duty has been that of chairman or president, and, having been kept always at work in committees, and for the good of the cause, I have had no chance to look at the structure which we have built, from the standpoint of a critic. Knowing, however, of the work, the builder can well afford to allow thorough inspection of the structure.

After six years of labor as your president, it seems that I am entitled to retire from the burdens and responsibilities of that position, and to turn over to your chosen executive the future of this association. In doing so, it would be far from my personal desire to have my successor feel that he was taking a position whose responsibilities far outweighed its pleasures.

I shall never forget the pleasant associations of this organization, and shall always remember with pleasure the confidence, respect and honor which has been shown me by you, in electing me, without opposition, for six consecutive terms. It is a compliment never to be forgotten by myself and friends. With all my heart I thank you for it.



HUGH DOUGHERTY.

The policy of the association, like those of all other organizations, has been formed from necessity. The cause which made it imperative that we should organize, made our policy, and the men who were selected as your trustees to perfect and further your interests, wisely yielded to the necessity of accomplishing the one thing more essential in the past than all others. We became, therefore, as some say now, an organization of one idea. We are all glad that that one idea set in so strongly that it caused us to save ourselves the right to carry on telephone business.

When those of us who had invested our money in telephone plants found that our enthusiastic friends who had become interested in manufacturing were, through their desire to sell us their goods, blinded to the dangers of patent litigation, we concluded that the old adage, "If you want your work done well, you must do it yourself," held good in this case, and so we organized, and placed our shoulders to the wheel with a few who were already trying to uphold our rights in the courts, and have kept at it until the courts have announced that we have a right not only to manufacture and sell telephones, but to operate them, a right which the owners of telephone patents claimed belonged to them only. Men must always establish their rights to do business. This is the first and fundamental part of any business proposition. It has taken us several years to do this in the courts. Our rights having

GROUP OF ATTENDANTS, INDEPENDENT TELEPHONE ASSOCIATION OF THE UNITED STATES OF AMERICA, CHICAGO, JUNE 24, 25, 1903.

been established, we find as another evidence that we were right in our contention that the investors of this country have placed in use more Independent telephones than are operated by the Bell Telephone Company, a fact most remarkable, and one hard to believe.

We feel, after our right has been established and so much capital has been invested in the business, that we have reached a place where the best interest of the business requires a reorganization of this association. Upon what lines shall it be reorganized? This is the most important question to be considered by this convention. This organization, up to the present time, has always been neutral so far as conflicting interests have been concerned, and has taken the broad ground of protection and promotion of general interests only. We will all agree that in this there shall be no change; that the organization must not be allowed to get into the hands of people who would turn it into a machine to promote the interests of persons or corporations, against the interests of others.

We fought this all out in the first convention at Detroit, where there was an effort made to capture it for the benefit of a manufacturing and construction company. The question was so thoroughly settled at that time that there has been nothing of a serious nature in this line with which to contend since. We can take it for granted, therefore, that the majority of the delegates, if properly informed, will vote for a continuance of that policy.

But, having established our right to do telephone business, by appeal to the courts, and having succeeded in building up a business equal to that of the Bell telephone companies, the most important questions for discussion and determination are those relating to the economies in construction and operation in order to give to the investor the largest net profits under existing telephone rates. As is always the case in competition, we find our companies giving a greatly extended telephone service at a greatly reduced price, so that the question of economy is of great importance. There should, therefore, be an organization which will devote its time to this. We believe this is the next duty presented to this association. Place it for management in the hands of technical telephone men, who, during the year and at the annual meetings will educate us as to the best and cheapest way of carrying on the business. We have in our ranks a great number of competent and able men who will place this organization on a footing with other technical organizations in other lines. I submit this to your consideration and deliberation, and hope that the idea can be carried out completely when the new organization is formed.

Since the courts have sustained us, we must expect that we will find other obstacles to overcome. We must expect that capital will seek its greatest reward, that it will not stand by and submit to loss when ways are open to make money. We must see that the business makes money for capital. We cannot expect to continue to get money to invest unless we can show proper results; so, in turning our attention to these questions of reward to capital through an organization as above outlined, we may do much toward overcoming the dangers which arise from a purely commercial fight for supremacy.

Every city and district of the United States has benefitted on account of telephone competition. Not only has service been extended about sixfold, but rates have been reduced more than 25 per cent, so that these conditions bring to us new problems continually. We believe they must be solved by rules governing commercial business, and practical telephone men must determine how best to subserve the interests of the investors and the patron.

What we all want, and what everyone should work to accomplish, is to bring the business up to a commercial level with other public utilities, so that the investor will feel that with greater development comes a more stable investment.

After the president's address, the report of the litigation committee was read by Hugh Dougherty, chairman of the committee. On motion of L. A. Frazee, the report was adopted and the committee was given a vote of thanks by the convention. The report follows:

REPORT OF LITIGATION COMMITTEE.

To give you merely a simple statement showing the amount of money received and paid out in the matter of defending your interests against suits brought by the Bell Telephone Company against Independent operators would scarcely be satisfactory, and yet I must be brief in general details.

In May, 1897, there was a meeting of a few persons representing telephone interests in Ohio and Indiana at Fort Wayne, which resulted in the meeting being called at Chicago in June of the same year, when your association was formed, and Hon. James M. Thomas was elected president of the association.

The first steps looking to some protection of your interests against patent suits brought by the Bell Telephone Company were taken at the next meeting, held in Detroit. There was professed in that city great interest in Independent telephony. There had been much money spent and an exchange was well under construction, and, of course, it was proper and right that the people of Detroit should be interested in this association.

It developed before the time of the meeting that the persons in charge of the Detroit exchange were intending to

capture the convention and control the officers that they might turn the convention to their selfish interest. In this they failed, and subsequent events have proved that those who secured their defeat acted wisely, because they soon thereafter sold out to the Bell, thus showing that they had no original honest purpose to build up a great Independent system in this country.

The fight in the convention at Detroit developed the fact, through the speeches of lawyers who argued in behalf of the people of Detroit, that should your association take up the question of defending the suits brought in Boston against the National Telephone Company and the Century Telephone Company, every contributor to your association would be a party to the suit. Therefore the advisory board wisely concluded that while these suits must be defended through the influence and machinery of your association, yet the record of such defense and the contributions of funds must be kept and handled so as to conceal the chain that would lead up to the discovery of how and by whom the defense was made; for if the contributors had been exposed it was believed by the best legal authority that should the Bell win the first suit, an injunction would lie against each one of the contributors.

This made it extremely embarrassing to the advisory board and the committee on litigation, and gave an opportunity to censure the advisory board and executive officers of your association, because of a lack of knowledge as to what was being done. But for all that, I am very proud of the fact that the confidence in the advisory board and executive officers was sufficient to keep them in office until the end of the litigation has been reached and the investments represented by this association have been made safe.

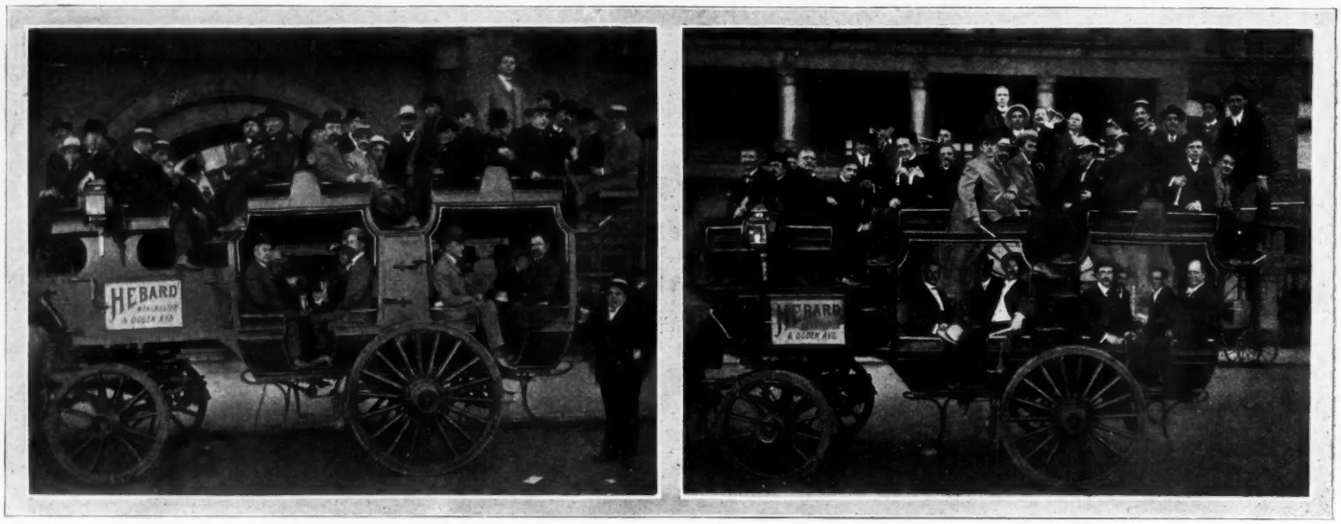
While I feel it my duty to say that the members of the advisory board and the executive officers, as a whole, or as individuals, never faltered in their efforts to raise money, gather evidence and do everything necessary to make a proper defence against these suits, yet I want especially to mention that Judge Thomas, the president of your association from the beginning up to this time, not only gave up every moment of time necessary, but practically abandoned his business, and for months his entire time was given; and the best of part of it is when he gave his time he gave skill and ability in your behalf, which, as a whole, has been worth to you, representing the entire Independent system of this country, millions of dollars. While it would be asking too much of this association to remunerate each member of the advisory board of the litigation committee, I insist that you can not do less than pay Judge Thomas for his time and ability spent in your behalf.

JAMES M. THOMAS.

FRANK G. JONES.

At Detroit his salary was fixed as president of the association, but was not paid him because of the fact that it would hazard your interest. Yet that salary was intended to be paid. However, when it was found that money could scarcely be secured to keep the litigation going, Judge Thomas generously declined to allow any money to be paid him for his services and time, and would not allow the matter to be considered until every dollar was provided for covering the litigation fund.

I now insist it is your duty as a convention not to adjourn until means be provided so that he be paid that which is justly due him, and if you do less than this you will not only have failed to do your duty towards him, but will have robbed him and his family of money due him for services and time which have been of vast benefit to you. I do not




TALLY-HOS TAKING CONVENTION DELEGATES TO SANS SOUCI PARK, JUNE 24, 1903.

believe this association can or will take any other view of the matter.

The first litigation committee was appointed at the Detroit meeting of the national association, which was composed of Judge J. M. Thomas, Hon. H. D. Critchfield of Ohio and Judge Savage of Pennsylvania. At the time this committee was appointed there were two suits pending in the United States Circuit Court at Boston, which were defended by E. P. Payson, an attorney of ability; but Mr. Payson found his client in the hotbed of the Bell Telephone Company interests without means to defend itself. The president and other officers of the defendant company had abandoned it, all but its treasurer, J. H. Leatherbee, who had employed Mr. Payson to make the defense. They were entirely unable to get together the evidence and pay the expert witnesses, so the litigation committee commenced at once to make such arrangements and to have money put in the hands of Payson from unknown sources, that he might use it in procuring evidence. This enabled him and Judge Taylor, who was afterward associated with Payson by your committee, to defeat the Bell Telephone Company in the United States Circuit Court and then in the United States Court of Appeals, and they not having appealed to the United States Supreme Court up to this time, the question is settled.

It was partially agreed that Hon. Chas. H. Aldrich of Chicago be employed prior to the time Judge Taylor was employed in the case, but this plan was changed to the satisfaction of Mr. Aldrich and the amount of money to be paid him, $4,000, was then transferred to E. P. Payson.

At our next meeting, held in Chicago, Mr. James B. Hodge of Cleveland was made a trustee of the fund at the request of Judge Thomas, and subsequently he was superseded by Hon. S. P. Sheerin of Indianapolis. In the meantime Hon. R. S. Taylor of Fort Wayne was employed to act in conjunction with E. P. Payson, when Judge Thomas and myself were appointed at a called meeting of the advisory board at Cleveland to take charge of the management of the case.

At this time funds had been exhausted and the expert witnesses, court costs, briefs, etc., had to be paid for. Money was raised, and Judge Thomas and I went to Boston, where we went to aid Payson in whatever way we could to prosecute the case and furnish what money was necessary to pay expenses. We found Payson absent and traced him to Moose Head Lake in Maine. We found him in a retired place with the room full of books and papers, preparing for the case to be held before the United States Circuit Court in Boston. We paid him $2,000 at this time, which gave him new courage and energy, although he was not lacking in interest or industry when we reached him.

I will not undertake to mention the trips that were made by Judge Thomas and myself, but there was a considerable number, covering nearly the entire country, and I have personal knowledge that Judge Thomas made a great many trips and spent a great deal of time with the former committee on litigation before I became active with him. He also attended court when the arguments of the case were made, and did everything that he could to get such influence before the court as would show the importance of the case on our side.

The labor done, however, by Judge Thomas and those associated with him was not all for the Berliner patent in Boston, but also in another case nearly equal in importance, though not quite so vital if lost, known as the Carty case.

The litigation in this case was largely carried on during the period in which Judge Thomas and myself were in charge of the litigation for your association. This required quite as much time in gathering evidence and looking after the defenses and as much money to carry it on as did the Berliner case, as the evidence had to be gathered from people throughout the entire United States that had been in the service of the Bell Telephone Company of Chicago and knew of the prior use of the Carty patent. These witnesses had been scattered all over the country, having left the employ of the Bell company, and had to be looked up. Depositions had to be taken and witnesses brought into court from long distances and at great expense.

In this case the Bell Telephone Company had won the case against the Independents, having commenced suit at Pittsburg against the Milheim Telephone Company, a very small company. After the case had been commenced it was alleged that they bought out the defendant company and directed the litigation secretly on both sides, and, of course, got a judgment against the Independents for infringement. In this case we employed C. C. Bulkley of Chicago and Hon. R. S. Taylor of Fort Wayne. After the Bell had obtained judgment they undertook to enjoin the Independents from the use of the Carty patent under their judgment. Through great effort and loyal ability they were thwarted in this and their judgment set aside because it was obtained through fraud.

In this case everything has been paid for, including the argument in the case now before the United States Court of Appeals, which is not decided. Your committee, however, feels confident that the decision will be in our favor.

It would require too much time and space to go into detail as to what was done by your committee in gathering

money at times when it seemed almost impossible to further retain the confidence of the association; but it is sufficient to say that the committee was compelled at one time to borrow a sum of money on its own credit in order that the evidence be gathered in time for the case.

At another time Judge Thomas and myself gave a personal guaranty to the amount of $4,000 to the attorneys to keep the case going. In addition to this the suit had been won at Boston in the United States Circuit Court, and while pending on an appeal Mr. J. H. Leatherbee, treasurer of the company, who was named as defendant, made a demand on us for $10,000, refusing, if the amount were not promptly paid, to allow the suit to be defended in court. Through the tact and skill of Judge Thomas the electrician of the defendant company at the time the suit was commenced was found and his consent secured to make him the defendant instead of the treasurer, who had refused to stand unless we paid him the $10,000.

After we had these obligations out, for which we were personally liable, the question of the fee for Judge Taylor for the final argument of the Carty case came up, and we were compelled to say to him that we could not personally guarantee his fee, when he very generously said all he would require of us was that we would do our best to see that he was paid, and he has been paid.

It is difficult to have you understand why large sums were paid out when you were not present through the entire transaction, and could not see the immense amount of work necessary to be done to cover these expenses. We were not permitted to give a detailed statement of what had been done with the money; but I am sure now a full and complete statement of everything that has been done cannot help but make the Independent telephone people of the United States feel that in Judge Thomas they have had a true and tried friend whose acts have always been unselfish and wise.

Following I give you a statement of receipts and expenditures, not one dollar of which has ever been paid to any officer of your association, except Mr. Carr of Durham, S. C., who forcibly retained what was originally allowed for salary for him as treasurer out of money that went into his hands as treasurer of the association. No other member has felt he was entitled to take any money for his services as an officer or for his time given. No other person was ever paid any money except upon a voucher properly signed by the committee on litigation or the president and secretary.

I now submit to you in detail a statement of receipts and expenditures covering the entire time from the beginning of your association up to the present time, which were collected for the purpose of carrying on the litigation. The expenses for dues of the association is a matter entirely of a different character and not included with the fees collected or expended for this purpose. I am pleased to call your attention to the generous contributions by the manufacturers, as well as the operators.

RECEIPTS.

| | |
|---|---|
| C. A. Aldrich | $ 2,000.00 |
| J. M. Thomas | 1,000.00 |
| Aldrich & Thomas | 1,000.00 |
| United States Telephone Company | 750.00 |
| Kellogg | 1,000.00 |
| P. Burns | 500.00 |
| New Tele. Company, Indianapolis | 500.00 |
| New Long Distance Tele. Co., Indianapolis | 200.00 |
| United Tele. Co. | 50.00 |
| Home Tele. Co. | 50.00 |
| Ed. L. Barber | 250.00 |
| P. Burns | 300.00 |
| Geo. W. Beers | 500.00 |
| Citizens' Tele. Co., Muskegon | 150.00 |
| Citizens' Tele. Co., Grand Rapids | 200.00 |
| Cuyahoga & U. S. Tele. Co. | 1,000.00 |
| New Tele. Co., Indianapolis | 500.00 |
| New Long Distance Tele. Co. | 500.00 |
| Sterling Electric Co. | 500.00 |
| Kellogg Switchboard & Supply Co. | 1,000.00 |
| American Electric Co. | 1,000.00 |
| Citizens' Tele. Co., Grand Rapids | 300.00 |
| Holtzer-Cabot Electric Co. | 500.00 |
| Citizens' Tele. Co., Columbus, Ohio | 250.00 |
| Federal Tele. Co., Cleveland, Ohio | 250.00 |
| U. S. Tele. Co., Cleveland, Ohio | 250.00 |
| Cuyahoga Tele. Co., Cleveland, Ohio | 250.00 |
| Anthracite Tele. Co., Wilkesbarre, Pa. | 50.00 |
| People's Tele. Co., Wilkesbarre, Pa. | 100.00 |
| Lackawanna Tele. Co., Scranton, Pa. | 100.00 |
| United Tele. Co., Bluffton, Ind. | 200.00 |
| New Long Distance Tele. Co., Indianapolis | 300.00 |
| Kellogg Switchboard & Supply Co. | 1,000.00 |
| American Elec. Tel. Co. | 1,000.00 |
| Citizens' Tel. Co., Ashland, Ky. | 50.00 |
| Lawrence Tel. Co., Ironton, Ohio | 50.00 |
| Cedar Rapids & Marion Tel. Co. | 100.00 |
| Pittsburg & Alleghany Tel. Co., Maryland Tele. Co. | 500.00 |
| Lorane Savings & Banking Co. Loan | 2,530.00 |
| Small Companies in Pennsylvania | 153.50 |
| Anthracite Tele. Co., Hazelton, Pa. | 50.00 |
| People's Tele. Co., Wilkesbarre, Pa. | 100.00 |
| Lackawanna Tele. Co., Scranton, Pa. | 100.00 |
| Holtzer-Cabot Electric Co. | 300.00 |
| Central Construction Co., Wauseon, Ohio | 250.00 |
| State Belt T. & T. Co., Nazareth, Pa. | 16.50 |
| Millville Tele. Co. | 1.00 |
| Lebanon Tel. Co., Indiana | 10.00 |

TALLY-HOS TAKING CONVENTION DELEGATES TO SANS SOUCI PARK, JUNE 24, 1903.

CHICAGO TELEPHONE SUPPLY COMPANY.

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|---|---|
| Standard T. & T. Co., Philadelphia | 10.25 |
| Home Telephone Company, Crawfordsville, Ind. | 45.00 |
| United Telephone Co., Bluffton, Indiana | 100.00 |
| Rochester Tele. Co., Indiana | 30.00 |
| Stromberg-Carlson Tel. Co. | 2,500.00 |
| Kellogg Switchboard & Supply Co. | 2,500.00 |
| Chicago Tele. & Supply Co. | 250.00 |
| American Elec. Tel. Co. | 2,500.00 |
| Farr Tele. Construction & Supply Co. | 200.00 |
| James B. Hoge, Trustee for Ohio | 4,000.00 |
| Fulton Tele. Co., Covault, Pa. | 1.90 |
| Twin City Tel. Co., Minneapolis | 100.00 |
| Ladoga Tel. Co., Indiana | 12.00 |
| Darlington Tel. Co., Indiana | 20.00 |
| Newton Tel. Co., Indiana | 9.60 |
| Shannondale Tel. Co., Indiana | 10.70 |
| Indiana Tele. Co., Indiana-Pennsylvania | 17.50 |
| Roachdale Union Tele. Co., Indiana | 10.70 |
| Waveland Tel. Co., Indiana | 15.00 |
| Forest T. & T. Co., Marionville, Pa. | 5.20 |
| Bloomington Tel. Co., Indiana | 25.00 |
| Sterling Elec. Co., Lafayette, Ind. | 1,250.00 |
| Rochester Tel. Co., Indiana | 15.00 |
| National T. & T. Co., Ft. Wayne, Ind. | 125.00 |
| Tipton Tel. Co., Indiana | 42.84 |
| Wabash Tel. Co., Indiana | 51.33 |
| Danville Mutual Tel. Co. | 69.75 |
| S. Morrison Tel. Co., Greenfield, Ind. | 67.50 |
| Greencastle Tel. Co., Indiana | 52.50 |
| Advance Tel. Co., Advance, Ind. | 13.50 |
| United Tel Co., Bluffton, Ind. | 161.25 |
| Home Tel. Co., Richmond, Ind. | 200.00 |
| Lebanon Tel. Co., Indiana | 20.00 |
| La Fayette Tel. Co. | 195.00 |
| Franklin Tel. Co., Indiana | 33.75 |
| Indiana Mutual Tel. Assoc. | 398.35 |
| W. H. Durrin, Cedar Rapids, Iowa | 130.00 |
| Julius Andrae & Sons, Milwaukee | 25.00 |
| F. Bissell & Co., Toledo | 25.00 |
| West Michigan Tel. Co., Allegan, Mich. | 10.00 |
| New Tel. Co., Indianapolis | 600.00 |
| New Long Distance Tel. Co., Indianapolis | 90.00 |
| Martinsville Tel. Co., Indiana | 52.00 |
| Union Tel. Co., Alma, Mich. | 150.00 |
| Citizens' Tel. Co., Columbus, Ohio | 58.00 |
| Sumter Tel. Mfg. Co., Sumter, S. C. | 100.00 |
| Kellogg Switchboard & Supply Co. | 1,000.00 |
| Central Elec. Co, Chicago | 125.00 |
| Electric Appliance Co. | 125.00 |
| Intrnational Tel. Mfg Co. | 100.00 |
| Illinois Elec. Tel. Co., Chicago | 50.00 |
| Menominee Elec. Mfg. Co., Michigan | 100.00 |
| Telephone Magazine, Chicago | 25.00 |
| Fred Deland, Pittsburg | 100.00 |
| Vought Burger Co., La Crosse, Wis. | 25.00 |
| F. Bissell Co., Toledo, Ohio | 25.00 |
| Valley Tel. Co., Saginaw, Mich. | 75.00 |
| Sterling Elec. Co., Lafayette, Ind. | 250.00 |
| Monroe County Tel. Co., Dundee, Mich. | 5.00 |

TURNER BRASS WORKS.

| | |
|---|---|
| U. S. Nagel Elec. Co., Toledo, Ohio | 50.00 |
| Swedish American Tel. Co., Chicago | 125.00 |
| Citizens' Tel. Co., Muskegon, Mich. | 150.00 |
| Telephony Pub. Co., Chicago | 50.00 |
| Kinloch Long Distance Tel. Co., St. Louis | 50.00 |
| Louisiana Tel. Co., Louisiana, Mo. | 25.00 |
| Kirksville Tel. Co., Kirksville, Mo. | 20.00 |
| Macon Tel. Co., Macon, Mo. | 12.50 |
| Palmyra Tel. Co., Palmyra, Mo. | 10.00 |
| De Soto Tel. Co., De Soto, Mo. | 5.00 |
| Nevada Tel. Co., Nevada, Mo. | 5.00 |
| Livingston Home Tel. Co., Howell, Mich. | 25.00 |
| Kimloch Tel. Co., St. Louis, Mo. | 200.00 |
| Louisville Home Tel. Co., Louisville, Ky. | 500.00 |
| Automatic Elec. Co., Chicago | 2,500.00 |
| Frontier Tel. Co., Buffalo | 250.00 |
| F. Bissell Co., Toledo, Ohio | 50.00 |
| Standard Underground Cable Co., Pittsburg | 250.00 |
| Sumter Tel. Mfg. Co., Sumter, S. C. | 100.00 |
| New Long Distance Tel. Co., Indianapolis | 75.00 |
| Kellogg Switchboard & Supply Co. | 340.00 |
| United Tel. Co, Bluffton, Ind. | 100.00 |
| Greencastle Tel. Co., Indiana | 15.00 |
| New Tel. Co., Indianapolis | 75.00 |
| New Long Distance Tel. Co., Indianapolis | 25.00 |
| New Tel. Co., Indianapolis | 25.00 |
| North Elec. Co. | 1,000.00 |
| American Elec. Tel. Co. | 1,250.00 |
| Kellogg Switchboard & Supply Co. | 660.00 |
| Hugh Dougherty | 220.00 |
| Kellogg | 250.00 |
| Total receipts | $50,127.12 |

DISBURSEMENTS.

| | |
|---|---|
| E. P. Payson, attorney, Boston, Mass. | $ 2,000.00 |
| E. P. Payson, attorney, Boston, Mass. | 1,000.00 |
| E. P. Payson, attorney, Boston, Mass. | 1,000.00 |
| E. P. Payson, attorney, Boston, Mass. | 2,000.00 |
| R. S. Taylor, attorney | 750.00 |
| J. M. Thomas, expense to Boston | 92.16 |
| Hugh Dougherty, exense to Boston | 37.84 |
| R. S. Taylor, attorney, by Hoge | 1,220.00 |
| C. C. Bulkley, attorney | 6,107.49 |
| R. S. Taylor, attorney | 4,014.85 |
| J. W. Brennen | 1,800.20 |
| Lorane Savings & Banking Co., bal. on note | 1,080.00 |
| Interest on same | 16.20 |
| Interest on above note, postage and telegram | 89.59 |
| Western Union Tel. Co. | 18.02 |
| Postal Telegraph Co. | 2.00 |
| R. S. Taylor, attorney, expense in Berliner case | 522.60 |
| C. C. Bulkley, services Carty patent case | 5,000.00 |
| J. W. Brennen, services Carty patent case | 600.76 |
| E. P. Payson, attorney's fee Berliner case | 4,000.00 |
| E. P. Payson, attorney's expenses | 1,100.00 |
| S. P. Sheerin, expenses | 1.81 |
| C. C. Bulkley, services Carty case | 1,000.00 |
| R. S. Taylor, services Carty case | 1,500.00 |

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|---|---|
| E. P. Payson, expenses Berliner case | 231.89 |
| J. W. Brennen, services in Carty case | 50.00 |
| J. W. Brennen, services in Carty case | 115.00 |
| Exchange on draft | .20 |
| R. S. Taylor, services Carty case | 1,000.00 |
| R. S. Taylor, expenses Carty case | 272.41 |
| Hugh Dougherty, exp. Washington to Boston and return. | 31.00 |
| J. M. Thomas, expense New York to Boston and return. | 19.50 |
| R. S. Taylor, expenses Berlinger case | 286.18 |
| J. B. Ware, expenses | 52.95 |
| J. M. Thomas, expenses | 41.40 |
| C. C. Bulkley, services in Carty case | 1,000.00 |
| R. S. Taylor, services in Berliner case | 2,000.00 |
| J. B. Ware, expenses | 32.08 |
| E. P. Payson, copies of Berliner decision | 20.00 |
| J. M. Thomas, hotel and traveling expenses | 303.00 |
| Hugh Dougherty, hotel and traveling expenses | 155.25 |
| E P. Payson, attorney Berliner case | 2,500.00 |
| E. P. Payson, attorney Berliner case | 1,000.00 |
| C. C. Bulkley, services and expenses in Carty case | 475.00 |
| E. P. Payson, balance in full for services Berliner case. | 500.00 |
| Jennie McFall, services as stenographer | 25.00 |
| J. B. Ware, expenses | 40.00 |
| C. C. Bulkley, Carty case | 1,000.00 |
| C. C. Bulkley, in "full" | 3,250.00 |
| F. W Dunbar, in full for services as expert | 660.00 |
| Balance in Treasury June 23d, 1903 | 62.74 |
| | $50,127.12 |

"The Telephone in the Technical Schools" was the first paper read. It was presented by J. C. Kelsey, professor of Telephony at Purdue University, Lafayette, Indiana, and was well received. The paper in full follows:

THE TELEPHONE IN THE TECHNICAL SCHOOLS.

In this commercial age, whenever a new branch of science or industry exhibits unusual activity and growing importance, the authorities of our universities are ordinarily prompt in adopting a course of instruction especially adapted to that particular work. Electrical engineering, journalism, insurance and commerce are some of the branches which have received consideration by leading universities. A late and prominent branch of industry is that embraced by telephony, and this lusty offspring of electrical engineering now vigorously demands recognition. But progress will be slow in this direction, if we rely upon scholastic opinion.

Prior to the adoption of the course of telephone engineering at Purdue University, inquiries were made of many persons known to be interested in the telephone, and of a number of professors of electrical engineering, and nearly every person interrogated, who was interested from a manufacturing or operating standpoint, was in favor of the movement, while nearly to a unit, the idea was opposed by the university authorities on the ground that there was no demand for such a course.

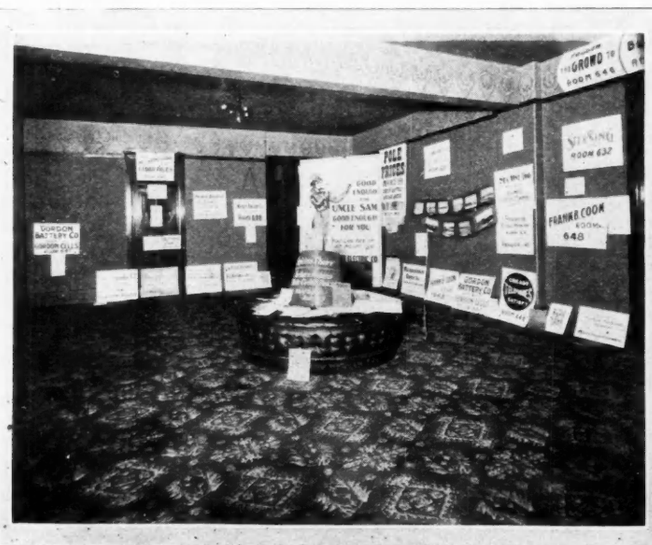
There is a great deal of justification for the attitude of the instructors. For years, they endeavored to investigate the possibilities of the telephone, but there was not much to discover, for the efforts made by the telephone interests of past years to help them were microscopic. In most university laboratories a Blake set and an obselete drop are the sole representatives of a great branch of electrical engineering. Surely, in these there is not much to attract the teacher or the student; much less induce him to look with favor upon the advantages of studying telephony as a life work.

But changes have taken place. Competition brings out man's best effort. The old and experienced telephone man, with his knowledge of detail has combined talents with the later generation of electrical engineers, and a system has been evolved which combines all the lighter, as well as much of the heavier construction features of electrical engineering, making the practice of telephony an acceptable profession. However, to place telephone engineering where it rightly belongs, the attention of the scientific world must be attracted by our deeds and words.

The American Institute of Electrical Engineers is the body to which we look for the official expression of the electrical profession. Everything good, novel and interesting is brought before this body. It is discussed freely and honestly, and if found meritorious, is given a place in the record for men to read and to think about. If telephone engineers had the inclination to take broad and comprehensive papers before that body, the engineering world would more fully realize the breadth of telephony, and scientific men would take more interest in studying the various and vexatious problems now confronting the practice of telephone engineering. This being true, we suggest that it would be much better if an institute of telephone engineers were to be organized and perpetuated.

The general public has not been fully educated as regards the telephone. It has seen demonstrations of light and power and transportation, and has been impressed. But the telephone is not a spectacular agency, and the public is not impressed. When students enter college to take mechanical or electrical engineering, they think they have a definite idea of what they want and ask no questions. But regarding the teaching of telephone engineering, many questions are asked.

These questions must receive due consideration. The university works in the open field, and its investigations




PLACARDED LOBBY ON SIXTH FLOOR AUDITORIUM.

THE STERLING ELECTRIC COMPANY.

NEW HAVEN NOVELTY MACHINE COMPANY.

MONARCH TELEPHONE MANUFACTURING COMPANY.

belong to the world. The apparatus it uses must necessarily come from the open field.

To say what should be taught would be impertinent. As now planned and administered at Purdue University, the telephone course begins in the junior year, after the student is grounded in mathematics and the fundamental principles of electricity. The regular electrical course is taken, simply substituting the telephone for the steam engine. The first consideration is a study of circuits, beginning with the old series grounded system, on through the metallic self-restoring drop period and then into the common battery systems. Each and every commercial common battery system is discussed and analyzed in the class room, and in the laboratory the various relays, impedances and lamps are arranged on tables, not only to show accuracy of connection and transmission, but to enable the student to observe the methods and rules of operation.

After the "A" circuits are well understood, the "B" circuit of each system with the accompanying order wire, busy test method, and manual and automatic ringing, is taken up. The laboratory is divided, so that the "A" and "B" operators are in separate rooms, thereby making the student appreciate fully the usage of the order wire, the method of disconnection, and the general rule of operation.

After the "B" circuit, with its free inter-office service, and its charge for interurban service is investigated, the toll business is studied. The many phases of operation, the methods of switching and recording, and the auxiliary uses of the toll line are given as much attention as is possible outside of regular business.

Upon this foundation, the second year begins the details of the various systems, and a study of the appliances and circuits connected with the chief operator's, chief inspector's, supervisor's and manager's desks. Complete specifications and drawings of entire systems are made. A mathematical investigation of the loaded line is also made with experimental conditions, operating cable being used for that purpose. The limitations of common battery systems, as regards distance of a subscriber from the exchange, affecting transmission and operation of relays; the effects of induction, from one, two or three-phase alternating currents, from 104 to 9,000 volts pressure, or from continuous currents, of from 110 to 500 volts, or from series arc systems; quick and efficient methods of cable testing; finding wet spots; open places; and crosses under actual working conditions; considerations of patent law and specifications and estimates upon overhead and underground construction are among the features of the course.

It must be understood that a technical school does not pretend to teach a man a trade or a profession. It only teaches him how to begin; it prepares him as a skilled apprentice, and not as a journeyman. Failure on the part of the student to realize this has frequently put him in a somewhat disagreeable light.

As to the necessity of the course, the experience of electrical engineering may be recalled. Time has disproved the early claims of the futility of such a course, for the graduates of the technical schools are hired by the electrical interests before they leave the institution. Upon this evolutionary ground we hope for the ultimate appreciation of the necessity of telephony having its proper place in the technical schools.

These schools can be of benefit to the telephone field by giving the results of research to the telephone public. If they are given knowledge of the various conditions of service, the schools will help to evolve, if not a standardization, at least a more general understanding of the rules and laws of design and operation. Schools have time in which to collect facts and to look into details and reasons which the busy commercial man has not.

If a school can do this, it is certainly an important factor in the progress of the open telephone field, and should be encouraged by every worker in the telephone industry.

Following Professor Kelsey's paper, S. P. Sherin offered a motion to amend the constitution of the association.

Mr. Sheerin in introducing his motion said: "Thus far our association has been an organization with company membership, each firm or company paying dues in proportion to the magnitude of its operations in the telephone field. It seems to be the opinion of a number of gentlemen with whom I have consulted on the subject that the time has come when we should reorganize on a basis of individual membership. Heretofore employes of telephone companies have had very little to do with the work of this association. I believe that every worthy person in the United States who is identified with Independent telephone interests should be a member of this association and have a place where he can stand on an equality with every other telephone man.

"While this association has accomplished the immediate object for which it was organized, it must not be allowed to die nor to in any way lower its standard. To this end a reorganization is necessary."

Mr. Sherin then read a new constitution, which had been prepared, and on his motion, seconded by H. C. Young, it was unanimously adopted. The new constitution follows:

CONSTITUTION AND BY-LAWS.

NAME.

Article 1—The name of this organization shall be the Independent Telephone Association of the United States of America.

OBJECTS.

Sec. 1. The objects of this association shall be to encourage in every proper way the development of the Independent telephone business of the United States, by embracing within its membership all owners, operators, employes and manufacturers of Independent equipment.

Sec. 2. Diffusion among its members of all attainable knowledge of the art that may tend to broaden their information, and add to their usefulness, efficiency and economy in operation.

MEMBERSHIP.

Sec. 1. Any person of good character engaged in any branch of Independent telephony within the limits of the United States shall be eligible to membership, upon election as hereinafter provided, and the payment of a membership fee of $2.00 and annual dues of $1.00.

OFFICERS.

Sec. 1. The officers of this association shall be a president, a vice-president, a secretary and treasurer (which latter two offices may be filled by one and the same person), and an executive committee of eleven members, two of whom shall be the president and secretary, who shall be ex-officio chairman and secretary respectively of said executive committee.

Sec. 2. The officers shall be elected by ballot, at each annual meeting of the association, and shall hold their respective offices for one year and until their successors shall have been chosen and qualified.

DUTIES OF OFFICERS.

Sec. 3. The president shall preside at all meetings of the association and executive committee, sign all orders on the treasurer, and discharge such other duties as usually devolve upon the president of an association.

The vice-president shall, in the absence or inability of the president, perform all duties of president.

The secretary and treasurer shall keep accurate minutes of the association, collect all monies due the association, give proper receipts for same, shall be responsible for the safe keeping of all funds, and pay the same out upon the order of the president for allowances duly made by the executive committee, and not otherwise. He shall also be the custodian of all books, papers and other property of the association, and shall give notice of all meetings.

The executive committee shall have all the authority of the association, except when the association is in session, not herein specifically delegated to the other officers.

SALARIES.

Sec. 4. The secretary and treasurer shall be allowed such reasonable salary as may be determined by the executive committee.

Sec. 5. The president, vice-president and members of the executive committee shall be allowed their actual expenses for attending meetings.

MEETINGS—QUORUM.

Sec. 1. A majority of all the members present at any annual or special meetings shall constitute a quorum. Thirty days' written notice of time and place of each meeting shall be mailed by the secretary to each member of the association.

A majority of the members of the executive committee shall constitute a quorum.

ELECTIONS.

Sec. 1. All elections shall be by ballot. The presiding officers shall appoint tellers to conduct the same.

BY-LAWS.

Sec. 1. The executive committee may in its discretion adopt such by-laws as it may deem expedient, not inconsistent with this constitution.

AMENDMENTS.

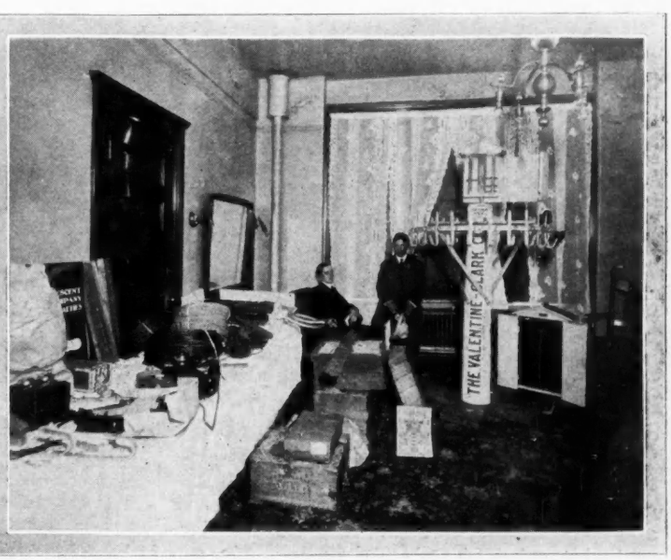
Sec. 1. This constitution may be amended at any annual meeting of the association by an affirmative vote of a majority of the members present.

After the adoption of the new constitution and by-laws, an invitation from President Francis of the Louisiana Purchase Exposition was presented, requesting the association to hold its next meeting in St. Louis, Mo., in September, 1904.

Prof. W. E. Goldsborough, chief of the electrical department of the St. Louis exposition, spoke briefly and added his invitation to that of President Francis. Prof. Goldsborough stated that a free hall and many other accommodations would be provided. On motion it was decided to accept the invitation.

President Thomas presented the matter of government statistics in regard to the telephone industry, and urged those present to co-operate as far as possible with the de-

FRANK B. COOK.




ILLINOIS ELECTRIC COMPANY.

WILLIAMS-ABBOTT ELECTRIC COMPANY.

EUREKA ELECTRIC COMPANY.

partment having the matter in charge, as these statistics are of great value in educating capital to an appreciation of the value of telephone investments.

J. G. Ihmsen, chairman of the general committee having in charge the entertainment of the delegates, announced that tally-hos would be in readiness at 7 p. m. to take the attendants through the South Chicago park system and to Sans Souci park, where amusement was provided.

SECOND DAY'S PROCEEDINGS.

Convention was called to order at 10 a. m. The report of the litigation committee having been previously submitted, C. E. Tarte was called upon and read a paper on "The Value of Good Work," which follows:

THE VALUE OF GOOD WORK.

Numerous and valuable papers have been written regarding the necessity of good construction and how it should be done.

It seems superfluous for the writer to say more on the subject, but it is such a vital one, it has such an important bearing on maintenance and depreciation, it means so much to service—in fact, it is so largely the one particular point that must not be overlooked when building a new plant or reconstructing an old one, that too much cannot be said about it.

As a general proposition all of the large companies and most of the small ones are doing new work along modern lines; but there is still some new work being done that looks as though the people doing it had been asleep for the last six or seven years and had nothing to go by but the standards of those days.

To such I wish to say emphatically that you are spending your money extravagantly and foolishly when you spend it on so-called cheap construction. Better for yourself, your stockholders and your subscribers if you built half as much and did it well than to build a great deal more and have to do it all over again in two or three years.

An attempt on the part of the writer to tell how good work should be done would be presumptuous, as there are numerous others better qualified and with a wider and more varied experience in this line.

We sometimes wonder whether this good, first-class construction will bring in the returns that have been claimed for it. I believe the history of a company having experienced both kinds, good and bad, will throw some valuable and interesting light on the subject. Acting on this belief, I will give a brief outline of the experience of the Citizens' Telephone Company of Grand Rapids, Michigan.

This company started giving service in July, 1896. The exchange was built according to the standards of that date. Very little cable was installed; cross arms were filled up, pins and knobs, twenty wires to arm; eight, nine and sometimes ten arms were used; roof fixtures were placed on business blocks; inside work was done with cotton covered wire; no attempt was made to run through porcelain or any other kind of tubes; where wires entered buildings and ran through floors, both wires were fastened under one staple; the only protection in the central office was a mica fuse; and so on through all the changes of that class of construction. Most of you know what it was like.

In a few years things commenced to get in bad shape. Overloaded and improperly guyed corners commenced to go over and wires to slacken up; iron wires in the business and factory district and around railroad yards began to rust out; trees commenced to grow up into leads that had been built barely over their tops; wires commenced to get slack and crosses were frequent. It was a difficult task to locate a cross in a long lead with from 160 to 200 wires in the lead, and a troubleman would often be out half a day or more on one cross.

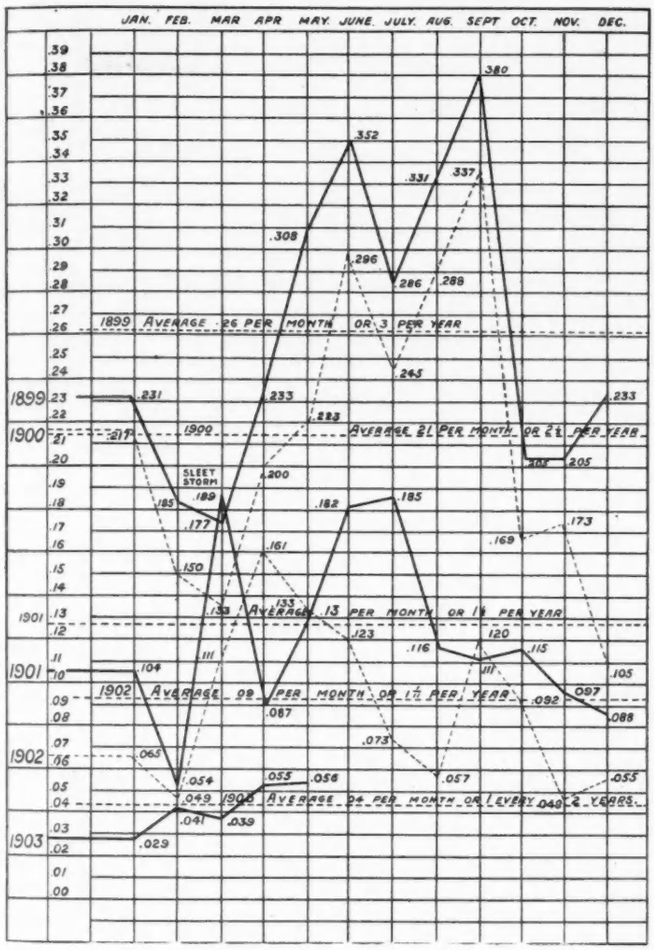
Imagine the condition after a wind or rain storm. Every one turned out to clear up trouble. Inspectors, installers, line troublemen, construction men and foremen chased up and down the streets and alleys looking for crosses and broken wires. No attempt was made to send after individual troubles until things were pretty well cleared up and the men were told to follow a lead and clear up everything that they could find.

Lightning played havoc with the switchboard and burnouts from crosses with trolley or electric light wires were of frequent occurrence. Occasionally the return wire would get in trouble and anywhere from fifty to one hundred and fifty subscribers would be in trouble until it was fixed up.

This experience taught a lesson. New work was done better and leads were not so overloaded. More ærial cables were used and some underground was installed. Slack was pulled, guys tightened, corners fixed and considerable money spent getting things in better shape. Very few lines were on metallic circuits, and when the city installed a new lighting system, using a 7,000 volt alternating current, the telephone company was almost put out of business. Hundreds of telephones could not be used after the city lights were turned on. On wet nights tree crosses between the return wire and the light wires were frequent and a great many indicators stayed down in the central office and prevented

subscribers from getting service; burn outs were frequent and dangerous.

This was the beginning of the end of old conditions. It was absolutely necessary to put in more cables, both aerial




LINE TROUBLE PER MONTH PER TELEPHONE—CITIZENS' TELEPHONE COMPANY, GRAND RAPIDS, MICH.

and underground, so that "return" lines could be changed to metallic circuits; wires had to be taken out of trees and kept clear and the good work has been going on ever since.

Before this summer is over, every roof fixture in the city will be down and all down-town wires taken care of through underground cables. Every line in the city will be metallic; no knob wires will be used and the plant will be as near to the condition of some of the good plants built recently as an old plant can possibly be.

Now for results. In January, 1899, the company started keeping a record of the number of troubles per day, dividing them into different classes—such as line troubles, battery troubles, transmitter troubles, inside wire troubles, etc., and a study of this trouble record is interesting.

In the year 1899, two years after service was first given, and before much had been done to put the outside plant in good condition, the record shows that there was an average of one line trouble every four months, or three per year for each and every subscriber in the exchange, and this record does not include line troubles that were cleared up and never reported, as in those days a man sent out to clear up all of the crosses in a lead would find a great many that had not been heard of.

Some improvements were started in the latter part of 1899, and the record for 1900 makes a better showing. There was one line trouble every five months or two and one-half per year per subscriber.

Improvements kept going on steadily, all new work was done in first-class shape, lines were being changed from "common return" to metallic and 1901 showed a decided gain. One line trouble every eight months, or one and a half per year.

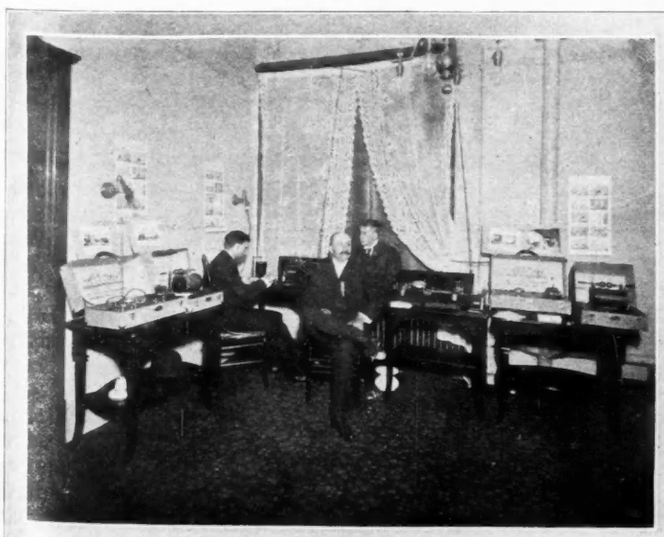
The year 1902 continued to feel the good effects and showed one line trouble every eleven months for each subscriber.

The good work still goes on. Knob wires are being done away with entirely. Roof fixtures and wires are disappearing rapidly, service wires are being run in such a way that troubles from them are practically unknown; leads are lightened up and cables taking the place of open wires and the result is that storms may come and storms may go, and unless they are cyclonic in character, service goes uninterruptedly on.

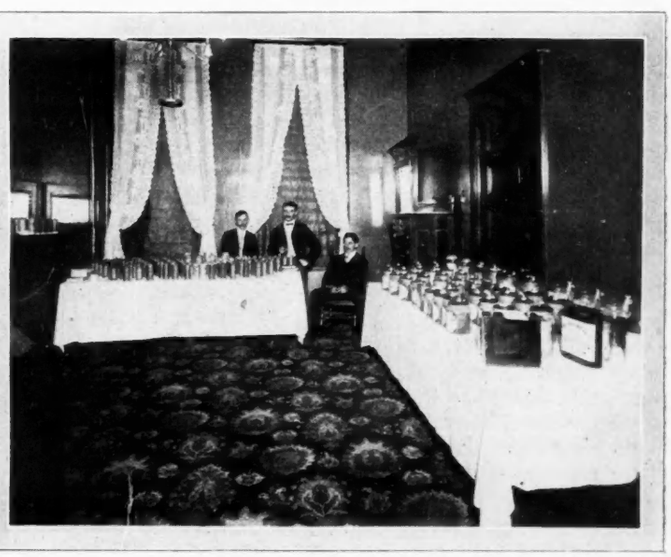
Records for five months in 1903 shows that there will be fifty per cent of one line trouble this year for each subscriber, or one every two years.

Summing things up, we find that in 1899, with 2,500 telephones there were 7,500 line troubles, while in 1903 with 5,000 telephones there will be only 2,500 line troubles, or one-sixth as many per telephone.

In other departments the same improvement is noted. All



THOS E. CLARK WIRELESS TELEGRAPH-TELEPHONE COMPANY.



NATIONAL CARBON COMPANY.

THE NORTH ELECTRIC COMPANY.

THE ELLIOTT & HATCH BOOK TYPEWRITER COMPANY.

cables installed during the last three years have been equipped with modern protection, and no central office apparatus has been burnt out on any line thus equipped. Inside wiring is now done with rubber covered and braided wire; wires are brought into buildings through tubes, etc., and the result is that the rewiring of buildings on account of leaks and short circuits is becoming a lost art.

Now as to the financial part of it, and what has been gained. The difference in cost per telephone, in salaries alone, of running what might be called the maintenance department (i. e., the inspection and trouble department—the maintenance line crew, and the emergency or "hurry-up wagon" as it is called) for the year 1903, as compared with 1899, will be $2.63 per telephone, or $13,413 per year for 5,100 telephones, which is the number that are now in service, and this notwithstanding the fact that wages are considerably higher than they were in 1899.

The depreciation on the present plant will not be one-third what it was on the original one, and the value to the company of the better service, resulting from fewer interruptions, cannot be estimated in dollars and cents.

With an active and energetic opponent in the field; with the latest and most approved Bell central energy multiple board as against a magneto transfer system; with the Bell rate until recently $8.00 lower for residence service and from $6.00 to $18.00 lower for business service, and the Bell rate even now, with the Independent company's switchboard filled up and six or seven hundred on the waiting list, $2.00 less for residence and in some cases $12.00 less for business; it behooves the company to do everything possible to give the subscribers good value for the money paid in, and the thing that has helped the most has been the rapidly decreasing number of troubles and the corresponding rapid improvement in the quality of the talking service.

Results on toll lines have been as satisfactory as with the local exchange. Building of new lines according to modern practice, reconstructing of old lines where necessary and putting them in first-class condition; protecting apparatus from lightning and other foreign current; using no wire smaller than No. 10 B. & S. gauge, etc., has so changed the condition on these lines that trouble is now taken care of with less work than was required three years ago when there were only about one-half as many miles of circuit.

The most important factor in construction work, as well as in the maintenance and operation of telephone exchanges is the human element. You may procure the best material that is in the market and buy the best tools that were ever made, but unless your superintendent of construction understands his business thoroughly, and has the saving quality of common sense; unless your foremen are intelligent enough to follow the line of work laid out by your superintendent of construction, and have the push and energy to see that the men under them do the work carefully and well, you will be disappointed in the results and lasting qualities of the work.

Having hired good men, thoroughly competent to do good work, it seems absurd to give them poor material to do it with. Labor is one of the largest items of expense in construction work, and good labor used on material that will wear out in two or three years is wasted and thrown away.

Having good, first-class material to work with, hire first-class men to do the work, and when it is finished you will have something to be proud of. Depreciation will be low, maintenance will be reduced to the minimum, and the quality of service will be such as to give you the confidence and backing of your subscribers.

The service question is more important than it was a few years ago. In the early days the public was satisfied with anything to beat the Bell, but the time has arrived when by our deeds we will be judged, and the company giving the best service at the most reasonable rates is the one that will get the business and will hold it.

A paper on "Eastern Telephone Development" was then read by F. A. Demarest, manager of the Inter-State Telephone Company of Trenton, N. J. This paper illustrates the growth of Independent telephony in the East, and follows in full:

### EASTERN TELEPHONE DEVELOPMENT.

Owing to the fact that the Independent telephone movement was born in the West, that its pioneers were Western men and that its greatest development has been in the West, few people realize the advancement that the industry has made in the East. As a matter of fact, development was slow in the Eastern states for some time after the Independents had built up many substantial enterprises throughout Indiana, Illinois, Ohio and other states in the lake and Mississippi regions.

Somehow it seemed a difficult task to make Eastern people realize that the days of telephone monopoly were over and that they could find relief from telephone oppression through the organization of Independent companies. But the knowledge finally came home to them, and since that time the East has gone about the task of fighting the monopoly with vigor and energy. But they have been so

busy building and establishing exchanges that they have had little time for publishing their achievements, and little is known of what they have actually done. And I am sure that what I tell you of the work will come to you as a very satisfactory revelation.

Practically the first companies to be established in the Eastern states had their birth in the state of Pennsylvania, and came into existence about the time of the alleged expiration of the basic Bell patents. The Bell company, profiting by its previous Western experience, knew that it could not afford to calmly ignore this opposition, and so naturally it made most determined efforts to crush out the industry at the first sign of its appearance in the East. The early ventures had some difficulty in establishing exchanges. In the first place, the early promoters found it somewhat difficult to obtain needed capital, which was more or less timid on account of statements which were being circulated by the Bell interests. Telephone users, however, were desirous of obtaining a more efficient service at reasonable rates. The Bell service satisfied neither of these demands, and the people knew, from experience, that it was impossible to obtain relief through the Bell company; but capital could not believe that an Independent company could make a successful stand against the monopoly, and it was hard work to persuade them to support such ventures. Arguments finally prevailed, and the monopoly's sins of omission and commission fully counterbalanced all other issues. Capital decided it would take some risk in the hope of improving telephone facilities. So the first Independent systems were launched.

But then appeared another serious difficulty. There was at that time practically but one manufacturer of necessary apparatus in the field, and on account of existing patents it was almost an impossibility to obtain suitable apparatus. It was also difficult to secure men with experience to build the plants. But the movement, with perseverance and a growing confidence, finally conquered every difficulty and succeeded in getting plants in operation.

It was later discovered that mistakes had been made. The Independents had been entirely too conservative in their estimates of the business they could look for. Their growth was absolutely unprecedented. The plants were built from the standpoint of the business the Bell company was doing. The new systems, however, proved so popular from the start that the plants were inadequate. The York Telephone Company at York, Pa., for example, was one of the first Independent companies in the state. Its promoters provided for five hundred subscribers. This was the ultimate number they expected to obtain. But within one year they found that their original plant was utterly inadequate, for within that time they had obtained between seven hundred and eight hundred subscribers, and new ones were signing contracts every day. Williamsport, Pa., where the West Branch Telephone Company had been started about the same time as the York plant, faced like conditions. Examples of this sort could be multiplied indefinitely. The kind of service they were able to give with such construction and apparatus and overcrowded and overworked plants can be imagined as not being first class, but nevertheless it was superior to the service the Bell had been and was furnishing, and the rates were more reasonable. This made the service popular and caused a rapid growth among a class never reached by Bell companies.

After the first Independent plants were in successful operation in Pennsylvania many other cities and towns, inspired by the success of these earlier ventures, organized companies and started the installation of plants. Their growth was indeed remarkable, and from the start they were successful. From Pennsylvania the movement spread to New Jersey, Maryland, New York and Delaware, the newcomers everywhere meeting with success and multiplying rapidly. As showing the wonderful growth of these early Eastern systems may be mentioned Allentown, Pa., which began giving service in July of 1900. The Allentown company built a plant to accommodate one thousand subscribers. They thought that if within three years they should have obtained 600 telephones they would be doing very well. To their amazement they were serving 1,000 patrons at the end of the first six months. Allentown now has a modern, finely equipped plant serving 2,400 subscribers. The early exchanges in Wilkesbarre and Scranton, Pa., and in other places in Pennsylvania, New Jersey, New York and Maryland had like experiences. In almost every case the probable number of subscribers that they could obtain was far underestimated by the early Independents in the East.

The development in the New England states, Massachusetts, Rhode Island, Connecticut, Maine and Vermont, was started about the same time, and a company was organized in New York city known as the Telephone and Cable Company of America to combine these interests, but was checked by a determined effort of the Bell interests. Development in the New England States was necessarily very slow. The reason for this is to be found in the fact that New England is the home of the Bell Telephone Company. Here it has enjoyed a complete monopoly that has been more far-reaching than in any other section of the country. Until the last year or so the Bell interests virtually owned the New England states—that is, so far as the telephone business was concerned. Independents found it absolutely impossible under the laws of the New England states to incorporate and install systems. They were combated not only by the Bell, but by politicians, the press and even by the mass of the people. But now these states are beginning to see that they have suffered greatly from the fact that they have kept down the Independent movement. The various state laws have been or will be revised and Independent companies can obtain franchises in New England cities and towns. Several New England cities already are served by Independent companies and have met with great success. Fall River and New Bedford, Mass., have had Independent systems in operation for over a year. Westerly, R. I., has had a system in operation for over eight months, and at Springfield, Mass., system is under construction. Boston, Mass., has an Independent system serving about four or five hundred subscribers. This company has made but little progress and is believed to be controlled by Bell interests. Portland, Maine, will soon have an Independent system with a capacity of ten thousand. It is being built by the Northwestern Telephone Company, which also operates exchanges in several Maine cities and owns several hundred miles of toll lines. The outlook in Maine, Vermont, Massachusetts and the rest of New England is at present very encouraging, and I expect to see a complete Independent system in this section in the not very distant future.

To tell of the development that has come in the states of Pennsylvania, New Jersey, New York and Maryland within the last two or three years would take much more time than has been allotted to me. I will, however, endeavor to present to you in a general way a slight conception of the scope of the Eastern Independent telephone industry.

The first effort toward getting an Independent company into the state of New Jersey was made in 1894, when some capitalists of Newark, N. J., attempted to organize a company to do business in Jersey City, Hoboken, Paterson, Trenton, Passaic, Orange, Newark, Elizabeth, Plainfield, New Brunswick, Asbury Park and many other Jersey cities. This move finally led to the organization of the State Telephone Company, with principal offices in Jersey City. It established exchanges in Jersey City, Newark, Trenton and several other places and constructed a number of miles of toll lines. There was every prospect of the ultimate success of this company, as the public was quick to appreciate

the advantages it offered and to patronize it. But finally the Bell interests brought such strong pressure to bear and offered so many inducements that they finally succeeded in securing a controlling interest in some of this company's property at a profit to some of its promoters. The Bell company still operates some of these exchanges under the guise of their being Independent, and thus makes it a difficult proposition for a legitimate movement to obtain franchises in the cities thus occupied.

In the meantime many other companies had sprung up in New Jersey which were more successful in meeting the competition of the Bell company. Some of the early New Jersey Independent companies were the Burlington County Telephone Company of Mount Holly, which was organized in 1897; the Bordentown Telephone and Telegraph Company, organized in 1898; the Paterson, Passaic and Suburban Telephone Company of Paterson and vicinity, organized in September of 1899; the Newark Molecular Telephone and Telegraph Company, Overland Telephone Company of New Jersey, Pennsylvania Overland Telephone and Telegraph Company, People's Telephone Company of New Jersey, Elizabeth Telephone Company of Elizabeth, Dowling International Telephone Company, Echo Telephone Company of New Jersey, People's Telephone Company of Vineland, Fairbanks Telephone Company, Bridgeton Telephone Company of Bridgeton and a score or more of others. Some of these companies never commenced operations, but were succeeded by other companies; a few were checked by the Bell interests, and the remainder with hardly an exception have been most successful, having been combined into larger companies within the last three years. The Eastern companies have learned the value of combining to better fight the Bell interests.

In the state of New Jersey our company, the Inter-State Telephone Company, was organized in April, 1901, for the purpose of consolidating the various New Jersey exchanges and constructing a toll line system. The companies it acquired were the Passaic, Paterson and Suburban Telephone Company, the Home Telephone Company of Trenton, the Burlington County Telephone Company of Mount Holly, the Elizabeth Telephone Company of Elizabeth, the People's Telephone Company of Vineland, the Bridgeton Telephone Company of Bridgeton, the Enterprise Telephone and Telegraph Company of Millville and the Atlantic Coast Telephone Company of Atlantic City. The Inter-State company has practically acquired all the Independent systems in New Jersey except the Eastern Telephone and Telegraph Company of Camden and those before mentioned as being operated by the Bell. It is rebuilding all the various systems acquired, as most of them had been very poorly constructed with antiquated apparatus. All exchanges will be of standard construction throughout. At the present time the company operates about 10,000 telephones in New Jersey, and it has been in operation only about two years. It has constructed many miles of toll lines and building operations are still going on, while the number of subscribers is increasing at an unprecedented rate. It has connections with Philadelphia over the lines of the Keystone State Telephone and Telegraph Company, the United Telephone and Telegraph Company, the Consolidated Telephone Companies and the Maryland Telephone and Telegraph Company, and will soon have New York state connections by way of the lines of the United company.

The greatest development in Pennsylvania has been in the Eastern part of the state. The Western part of the state, however, has been well looked after by the Pittsburg and Allegheny and other companies, which operate thriving exchanges in Pittsburg, Allegheny, McKeesport and many other places. Altogether the Pittsburg and Allegheny Telephone Company has 10,000 subscribers, and with its own lines and those of other Independent companies has connection with more than 40,000 subscribers on Independent systems. The Pittsburg and Allegheny and the other Independent companies in the Western part of the state have had a hard fight against the Bell, which has resorted to all sorts of tricks in its vain efforts to drive out competition. In Pittsburg, particularly, the Bell has many powerful friends, and the Pittsburg and Allegheny is at present defending itself against a most malicious attack by the Bell company in the matter of changing rates.

Eastern Pennsylvania is practically covered with an Independent system, the outgrowth of the numerous exchanges that were started from 1894 to date. Some of them were very poorly built, while others were installed in a first-class manner. As these plants were isolated from each other, the Bell company could use its powerful organization to extinguish these companies separately. Something had to be done to bring the exchanges into more harmonious working. With this end in view, in 1900, the United Telephone and Telegraph Company, which has headquarters in Philadelphia, was organized for the purpose of combining a great many of the smaller Independent systems in Eastern Pennsylvania. The companies that are now operated by this company are the Shamokin Valley Telephone Co., which was incorporated in December, 1894, and which was one of the very first Independent companies in the state; the Schuylkill Telephone Company, organized in May, 1895; the Octararo Telephone Company of Lewisburg, organized August, 1895; Delaware County Telephone and Telegraph Company, organized September, 1895; Keystone Telegraph and Telephone Company, organized June, 1896; North and West Branch Telephone Company, organized July, 1896; People's Telephone and Telegraph Comnany of Lebanon, organized March, 1897; Phoenixville Telephone Company, organized August, 1897; Chester County Telephone and Telegraph Company, organized February, 1898; Independent Telephone Company of Lancaster County, organized April, 1898; Central Commercial Telephone Company, organized May, 1898; Montour and Columbia Telephone Company, organized May, 1898, and the Ambler Telephone Company, organized in March, 1900. The United Telephone Company also operates many other exchanges and hundreds of miles of toll and long-distance lines.

The United Telephone and Telegraph Company in 1901 further formed the Cumberland Valley Telephone Company to combine numerous exchanges in Pennsylvania and Virginia. Among the companies under its management are the Hanover Telephone Company, the Western Maryland Telephone Company, Cumberland Valley Telephone and Telegraph Company, Franklin and Fulton Telephone Company, Juanita Telephone and Telegraph Company and several others. These are all controlled by the United Telephone and Telegraph Company, which operates at present over 140 Independent exchanges in Pennsylvania, Maryland and West Virginia, and also owns about 2,000 miles of trunk lines, which form a complete network connecting its various exchanges. It also operates exchanges in New York state at Elmira, Binghamton, Troy, Saratoga, Schenectady and Glens Falls, which in the very near future will be connected with its other holdings.

In the Northeastern part of Pennsylvania a number of Independent companies formed the Consolidated Telephone Companies of Pennsylvania. The principal exchanges are Wilkesbarre, Carbondale, Scranton, Hazleton, Reading and Allentown. These exchanges are all inter-connected and are also connected with the system of the United Telephone and Telegraph Company, with the Maryland Telephone and Telegraph Company, the Inter-State of New Jersey, the Keystone of Philadelphia and many others, giving perfect toll and long-distance facilities. The company is meeting with every success.

In Philadelphia the Keystone Telephone Company has been operating a little over a year and has had a remark-

able success. It now has more than 10,000 subscribers, with new ones deserting the Bell service for the Independent every day. Many of the principal business houses in Philadelphia have discarded the Bell telephone altogether. The long-distance branch of this company, known as the Keystone State Telephone and Telegraph Company, is rapidly building up a system of toll and long-distance connections with the surrounding territory that will enable Philadelphians to communicate with all parts of the country over the Independent lines. It has effected traffic agreements with the Inter-State Company of New Jersey, the United Telephone and Telegraph Company, the Consolidated Companies of Pennsylvania, the Standard Telephone and Telegraph Company, the Eastern Telephone and Telegraph Company and the Maryland Telephone and Telegraph Company, so that connections may now be had from Philadelphia all over the states of Maryland, Pennsylvania, West Virginia, New Jersey and even to some points in New York state. In a few months these connections will be greatly extended and lines now building will complete a most comprehensive system.

In Maryland as early as 1894 Independent systems were started and proved to the satisfaction of the public that the Independent exchanges were a necessity and a success. The largest company is the Maryland Telephone and Telegraph Company, which operates a fine exchange in the city of Baltimore and exchanges in many other Maryland cities. It also owns a large toll line system, connecting with the Pennsylvania and New York systems in the North and with Independent exchanges south of Maryland.

In New York state a remarkable development has been achieved within the last four or five years. The building operations alone at present being conducted in that state have cost millions, and every city of any importance, with the exception of New York, has an Independent system. Among the principal plants is that of the Frontier Telephone Company, which recently went into service at Buffalo with four thousand subscribers. Within a year this number will have increased to 10,000. Albany has a splendid Independent system in operation which is offering such a good service at lower rates than the Bell that it is rapidly superseding the old system. Ithaca has a new company which is giving a service to more subscribers than the Bell company. Rochester was one of the first large cities in which exchanges were built by the Independents. The Rochester company has recently installed a new switchboard double its original capacity, which would indicate that its development has been satisfactory. Niagara Falls has an Independent system and is the headquarters for the Niagara County Telephone Company, which operates between 4,000 and 5,000 subscribers in its several exchanges. In Binghamton the Independents have 1,500 subscribers to the Bell's 1,100; in Hornellsville there are 1,008 Independents and but 75 Bell; in Jamestown there are 1,630 Independent subscribers and only 630 Bell subscribers. And so on through all the cities and towns of the state the Independents have entered in and have taken business from the Bell. They are building toll lines, so that their system within the next few years will cover every nook and corner of the state. In all of the states I have mentioned the Independent systems now are really stronger than the Bell, and their growth is twice as rapid. It is my belief that in the next two or three years the East will equal the development of the middle West. Eastern capital is naturally conservative, but when it takes hold of anything it always wins.

Of all the larger Eastern cities the only ones not operated in by the Independents are New York city, Providence, R. I.; Jersey City and Newark, N. J. I feel certain that New York will have an Independent company in the near future. New York undoubtedly presents problems more difficult than any ever before met by the Independents. In the first place, it would require an enormous expenditure to install a plant there and it would present some very fine points in its engineering features. The Bell company operates a very complete system there, which makes the problem all the more difficult. But these obstacles are surmountable. Jersey City and Newark at present have alleged Independent systems, which, however, are in reality operated by the Bell company to keep out competition. This fact makes the Jersey City and Newark propositions difficult to the Independents. But the Independent subscribers in the state and in New York state, who greatly outnumber the Bell subscribers, are demanding the connection of New York city, Jersey City and Newark, and it is bound to come.

The outlook in the East is bright and promising. In the not distant future every city, every town and every farmhouse will be served by an Independent system, and every inhabitant of the cities and towns will be using telephones. I believe this is so and that I am not making a too optimistic prophecy. The development up to the present time has been most remarkable, and there is no reason for believing that the future development will not be just as wonderful.

Following Mr. Demarest's paper, L. W. Stanton of Cleveland addressed the association on "The Economy of Operation," using the blackboard to demonstrate his plans.

At the conclusion of Mr. Stanton's address, President Thomas was presented with a gold watch as a tribute from some of his friends who desired to express by this means their appreciation of his services to Independent telephony. The presentation was made by J. G. Ihmsen in his usual happy vein, and Mr. Thomas in accepting the gift expressed his sincere thanks and spoke feelingly of the high appreciation in which it would be held.

NATIONAL TELEPHONE SUPPLY COMPANY.

THE NORTH ELECTRIC COMPANY.

MILLER ANCHOR COMPANY.

The following officers and executive committee were then unanimously elected: Hugh Dougherty, Bluffton, Indiana, president; C. W. Cline, Hazelton, Pennsylvania, vice-president; Frank G. Jones, Chicago, Illinois, secretary-treasurer; executive committee, W. E. Goldsborough, Lafayette, Indiana; H. D. Critchfield, Chicago; J. G. Ihmsen, Chicago; Thomas Finucane, Rochester, New York; W. E. Doolittle, Lafayette, Indiana; C. E. Tarte, Grand Rapids, Michigan; E. H. Moulton, Minneapolis, Minnesota; A. L. Tetu, Louisville, Kentucky, and E. E. Clement, Washington, D. C.

After the usual votes of thanks the convention adjourned.

COMPLETE LIST OF ATTENDANTS.

A

Ault, Charles, New York; Ames, F. Z., Rutland, Ill.; Alderson, J. W., Mineral Point, Wis.; Auxer, F. P., Cleveland.

B

Barnes, Albert, Chicago; Burns, P. C., Chicago; Bishop, Fred, Central City, Ia.; Brobeck, J. G., Chicago; Burns, R. L., Hutchinson, Kan.; Bushing, F. O., Indianapolis; Barnett, Jas. F., Memphis, Mo.; Bromley, Jr., Thos., Muncie, Ind.; Banks, W. C., Chicago; Bissell, W. S., Toledo; Brown, Eugene L., Chicago; Briggs, Geo. A. Elkhart, Ind.; Barker, A. E., Chicago; Burlingham, Chas. L., Chicago; Bowman, L. G. Cleveland; Baily, Geo. C., Chicago; Bowman, W. P., Cleveland; Binkley, F. S., Chicago.

C

Christian, George Q. V., Troy, Ohio; Campbell, William P., Utica, N. Y.; Crumb, W. H., Chicago; Church, J. V. S., Chicago; Carney, W. J., Chicago; Conklin, A. B., Aurora; Clark, Ernest L., Chicago; Crook, J. F., Chicago; Critchfield, H. D., Chicago; Curran, A. J., Muncie, Ind.; Conover, Geo. W., Chicago; Colter, H. M., Chicago; Cravath, J. R., Chicago; Cuming, James S., St. Louis, Mo.; Clement, Edward E., Washington, D. C.; Cook, Frank B., Chicago; Cook, J. A., Chicago; Cobb, H. E., Chicago; Canmann, D. L., Chicago; Cushing, S. K., Chicago; Carman, Oscar, Indianapolis, Ind.

D

Davis, George S., Cleveland, Ohio; Dodd, Philip A., New York; Downer, J. D., Hinsdale, Ill.; Dunbar, F. W., Chicago; Doolittle, H. T., Lafayette, Ind.; Douglas, H. A., Jackson, Mich.; Dobbs, A. E., Chicago; Dorland, P. O., La Porte, Ind.; Dommerque, F. J., Chicago; Dougherty, Hugh, Bluffton, Ind.; Dare, J. R., Chicago; Donald, J. B., Calgary, Alberta; Deems, E. M., Chicago; Davenport, H. H., Chicago; Demarest, F. A., Trenton, N. J.; Dallas, A. C., Chicago; Duvall, S. A., Elkhart, Ind.; Deavitt, H. M., Chicago; Dedricksen, H. P., Chicago; Dinsmore, S. A., Chicago; Dreffen, E. L., Chicago.

E

Emrick, C. E., West Milton, Ohio; Ellenwood, W. R., Leon, Iowa; Edson, M. A., Chicago.

F

Farr, C. W., Chicago; Finch, J. C., Chicago; Freeman, Frank F., Dodgeville, Wis.; French, O. F., Cleveland, Ohio; Forbes, C. W., Chicago; Frazee, L. A., Connersville, Ind.; Fisher, E. B., Grand Rapids, Mich.; Fair, Geo. W., Chrisman, Ill.; Fennell, R. F., Charleston, S. C.; Fisher, John, Grand Rapids, Mich.; Forrest, E. Burr, Galliopolis, O.; Farris, T. F., Chicago.

G

Grant, W. E., Effingham, Kan.; Graffis, W. H., Chicago; Goldsborough, W. E., St. Louis; Greene, L. A., Chicago; Gleason, T. B., St. Louis; Garrett, F. H., Detroit, Mich.; Greer, Frederic, Chicago.

H

Hutchinson, A. L., Weyawega, Wis.; Hatch, C. O., Pleasant City., Ohio; Hubbard, I. T., Ottumwa, Ia.; Howk, C. L., Norwalk, Ohio; Hibbard, C. L., Chicago; Hubacker, J. C., Chicago; Hampton, E. C., Marion, Ia.; Holmes, George, Sherman, Tex.; Hamilton, C. W., Toledo, Ohio; Hall, Wilbur, Eddyville, Ia.; Hibbard, C. L., Chicago; Halloway, W. B., and wife, Eddyville, Ia.; Hoyer, Chas., Chicago; Harris, Sanford F., Chicago; Hipwell, H. H., Allegheny, Pa.; Hans, W. W., La Porte, Ind.; Henderson, P., Chicago; Hodges, Louis A., Monroe, Wis.; Hurst, E. M., Chicago; Harding, E. R., Chicago; Hussey, Allen, Chicago; Hopkins, Millard, Escanaba, Mich.; Harvey, N. G., Chicago; Healy, Frank, Chicago.

I

Ihmsen, J. G., Chicago.

J

Jipson, W. C., Blissfield, Mich.; Johnson, F. A., Victoria, Ill.; Johnson, Roy, Oregon, Ill.; Jones, Frank G., Chicago; Jones, S. A., Chicago; Jones, W. H., Chicago.

K

Kratz, Arthur B., Cleveland, O.; Keelyn, Jas. E., Chicago; Kelsey, J. C., Lafayette, Ind.; Koontz, C. E., Bremen, Ind.; Kelly, W. Σ., Chicago; Kenny, J. A., Chicago; Kaufman, E. E., Chicago; Kuzel, I. J., Chicago; Kuzel, H. J., Chicago; Keith, Carl, Chicago; Kirkpatrick, E. F., Chicago.

L

Lindsey, W. H., Dodgeville, Wis.; Lutz, G. H., Chicago; Lowthian, J. J., Newark, N. J.; LeBourveau, L. G., Chicago; Litscher, C. J., Chicago; Lindsley, Geo. L., Chicago; Lindsley, E. A., Chicago; Lewis, G. C., Chicago.

M

Mock, Ed J., Chicago; Miller, Robt., Muncie, Ind.; Mason, J. W., Chicago; Mueller, R. S., Chicago; McGillan, F. L., Chicago; Manson, Roy H., Chicago; Martin, F. L., Chicago; McMeal, H. B., Chicago; Mason, E. R., Chicago; Meisener, W. O., Chicago; Messenger, V. H., Chicago; Mason, F. J., Chicago; Moon, S. W., Chicago; Middleton, Frank L., Chicago; Miller, Kempster, B., Chicago; Maltby, I. A., Bay City, Mich.; Miller, C. H., Norwalk, O.; Moffatt, M. H., Cleveland; Meade, Morris W., Pittsburg, Pa.; Minhinnic, H. J., Chicago; Macklin, C. H., Chicago.

N

Nate, J. J., Minneapolis, Minn.; Nelson, H., Madison, Wis.; Navarre, J. A., Chicago; North, C. H., Cleveland; Naugle, A. T., Chicago; Nolke, E. J., St. Louis, Mo.

O

Obright, N. F., Chicago; Overshiner, E. B., Chicago; Overshiner, A. V., Chicago.

P

Penn, Jerome, Washington Courthouse, Ohio; Pancost, H. E., Mendota, Ill.; Putnam, J. L., Providence, R. I.; Platt, S. C., New York; Painter, A., Chicago; Price, H. A., Bay City, Mich.; Paradis, Ernest J., Toledo, O.; Porter, A. S., Chicago; Parish, J. H., Madison, Wis.; Pardee, F. W., Chicago; Platt, C. P., Chicago; Procunier, H. E., Chicago; Procunier, William, Chicago; Pitzker, E. J., Chicago.

R

Rudy, G. B., York, Pa.; Rowder, B., Dwight, Ill.; Rex, A., North Manchester, Ind.; Reid, John H., Philadelphia, Pa.; Riefstahl, Augustus F., Detroit, Mich.; Crentz, John, Blissfield, Mich.; Robinson, William, Muskegon, Mich.; Reeve, C. A., Plymouth, Ind.; Rogers, W. M., Chicago; Remey, O. D., Bay City, Mich.; Rodormer, George, Chicago; Randall, H. C., Elkhart, Ind.; Reade, H. W., Escanaba, Mich.; Rogers, W. W., Chicago; Rotchka, F. E., Lafayette, Ind.

S

Smith, Elmer E., Chicago; Stevens, C. F., Princeton, Ind.; Stratton, C. D., Lancaster, Wis.; Starkey, N., Pineville, Ky.; Stacey, A., Grand Rapids, Mich.; Seyler, C., Pittsburg, Pa.; Stanton, L. W., Cleveland. Schmidt, Lambert, New York; Sherman, O. M., Wanata, Ind.; Stevens Charles G., Chicago; Shunel, C. W., Casey, Ill.; Speed, J. J., Chicago; Stirling, Ackland, Detroit; Schade, Edwin D., Johnston, Pa.; Schweitzer, Richard, Detroit, Mich.; Sage, H. B., Indianapolis, Ind.; Shafer, Henry, Chicago; Shelby, Evan, Lafayette, Ind.; Straight, A. W., Chicago; Sapp, F. F., Cleveland, O.; Schwab, Henry, Chicago; Smith, J. A., Belleflower, Ill.; Stromberg, Alfred, Chicago; Stinson, C. E., Memphis, Tenn.; Slingluff, W. H., Chicago; Soloman, John I., Harrison, N. J.; Sheerin, S. P., Indianapolis, Ind.; Stoops, Claude R., Nappanee, Ind.; Smith, Hugh B., Muskegan, Mich.; Serviss, W. V., Owosso, Mich.

T

Trace, G. I., Chicago; Talbrett, William, Havana, Cuba; Tyler, R., Chicago; Thomas, James M., New York City; Trask, C. O., Springfield, Mo.; Tarte, C. E., Grand Rapids, Mich.; Thompson, H. Grant, New Haven, Conn.; Tompkins, F. J., Chicago; Trimm, W. H., Chicago; Tingley, A. J., Chicago; Taylor, Henry A., Lafayette, Ind.; Townsend, W. W., Chicago.

V

Viele, F. S., Pittsburg, Pa.; Van Middlesworth, Will, Racine, Wis.; Valentine, Richard, Janesville, Wis.; Van Gundy, H., Saybrook, Ill.; Valentine, E. H., Chicago.

W

Whaley, A. M., Chicago; Wood, T. H., Indianapolis, Ind.; Walsh, E. J., Chicago; Warner, T. W., Muncie, Ind.; Weim, P. J., Monroe, Wis.; Wilson, D. B., Shelbyville, Ind.; Wheeler, F. H., Chicago; Winter, H. C., Madison, Wis.; Ware, Joseph B., Buffalo, N. Y.; Wiley, J. R., Chicago; Warren, J. T., Memphis, Tenn.; Wayland, Samuel E., Scranton, Pa.; Williams, Jos. A., Cleveland, O.

Y

Young, Colonel H. C., Columbia, Pa.; Yaxley, E. E., Chicago.

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AMONG THE EXHIBITORS.

The following manufacturers, supply houses, cedar pole dealers and kindred manufacturers made exhibits or were represented at the convention:

American Electric Telephone Company, Chicago, telephone manufacturers, represented by P. C. Burns, president; J. G. Ihmsen, general manger; J. J. Speed, advertising manager; John H. Reid and L. A. Green.

Automatic Electric Company, Chicago, automatic telephone apparatus, represented by H. D. Critchfield, J. F. Crook and Sanford Harris.

American Electric Fuse Company, Chicago, protective devices, represented by Frank G. Jones, president; J. A. Kenny, general manager, and George Rodormer.

American Carbon Company, St. Louis, batteries and carbon specialties, represented by T. B. Gleason.

Acme Electric Company, Chicago, telephone manufacturer, represented by W. O. Meissner, president, and E. J. Walsh, secretary-treasurer.

American Pin Company, Waterbury, Conn., telephone specialties, represented by Albert Barnes.

Baker & Co., Newark, N. J., platinum, represented by J. J. Lowthian.

F. Bissell & Co., Toledo, Ohio, supply house, represented by W. S. Bissell and C. W. Hamilton.

Francis Beidler & Co., Chicago, cedar poles, represented by M. B. Cross and R. L. Jones.

Benedict & Burnham Brass & Copper Company, Chicago, brass and copper, represented by A. C. Dallas, secretary-treasurer.

T. H. Bullock & Co., Chicago, forwarding agents, represented by L. G. Le Bourveau.

Central Telephone and Electric Company, St. Louis, Mo., supply house, represented by James S. Cuming, president.

Edward E. Clement, Washington, D. C., patent attorney.

Carney Brothers' Company, Chicago, cedar poles, represented by W. J. Carney and E. E. Kaufman.

W. H. Crumb & Co., Chicago, contractors and engineers, represented by W. H. Crumb.

Thomas E. Clark Company, Detroit, Mich., wireless telephone and telegraph apparatus, represented by Augustus Riefstahl, F. H. Garrett and Ackland Stieling, advertising manager.

Chicago Pay Station Company, Chicago, pay stations, represented by J. C. Finch, manager sales department.

George W. Conover & Co., Chicago, purchasing agent, represented by George W. Conover.

Crawfordsville Wire and Nail Company, Crawfordsville, Ind., wire, represented by H. E. Cobb and Richard Schweitzer.

Frank B. Cook, Chicago, protective devices, represented by Frank B. Cook, president; J. A. Cook, C. E. White and F. J. Tompkins.

Chicago Telephone Supply Company, Elkhart, Ind., telephone manufacturer, represented by George A. Briggs, president; H. C. Randall, secretary-treasurer, and Stanley A. Duvall, electrical engineer.

Clark Automatic Telephone Switchboard Company, Providence, R. I., automatic telephone apparatus, represented by J. L. Putnam, general manager.

Chicago Writing Machine Company, Chicago, telephone holders, represented by F. W. Pardee.

Central Electric Company, Chicago, supply house represented by J. W. Mason, manager sales department.

H. M. Deavitt, Chicago, chemist.

Deveau Telephone Manufacturing Company, New York, telephone manufacturer, represented by Charles Ault.

Eureka Electric Company, Chicago, telephone manufacturers, represented by I. J. Kusel, president; D. L. Canmann, vice president; V. H. Messenger, secretary-treasurer; H. J. Kusel and H. P. Didriksen.

Electric Appliance Company, Chicago, supply house, represented by S. A. Dinsmore, manager telephone department.

Farr Telephone and Construction Supply Company, Chicago, telephone manufacturers, represented by Charles W. Farr, president, and E. W. Hurst, secretary.

Gould Storage Battery Company, New York, storage batteries, represented by E. L. Draffen, western manager.

Gordon Battery Company, New York, storage batteries, represented by E. M. Deems, western manager, and W. C. Banks.

General Electric Company, Harrison, N. J., miniature lamps, represented by John I. Solomon, manager lamp department.

Guarantee Telephone and Equipment Company, Chicago, second hand telephone apparatus, represented by F. J. Mason.

Holtzer-Cabot Electric Company, Brookline, Mass., and Chicago, generators, represented by E. R. Harding, western manager.

Harvard Electric Company, Chicago, protective devices, represented by Frederic Greer, president.

Hipwell Manufacturing Company, Allegheny, Pa., telephone manufacturer, represented by H. H. Hipwell, president.

Hubbard & Co., Pittsburg, Pa., supply house, represented by C. Seyler, manager sales department.

Allen Hussey Company, Chicago, interior telephone systems, represented by Allen Hussey, president.

A. P. Hopkins & Co., Escanaba, Mich., cedar poles, represented by Millard Hopkins, vice president.

Illinois Electric Company, Chicago, supply house, represented by Frank E. Healy, president; Carl Keith, treasurer; S. K. Cushing, secretary; N. G. Harvey and C. J. Litscker.

Illinois Electric Specialty Company, Chicago, pole changers and duplexers, represented by S. W. Moon, secretary.

International Telephone Manufacturing Company, Chicago, telephone manufacturers, represented by Henry Shafer, president, and Frank L. Middleton, manager sales department.

Indiana Steel and Wire Company, Muncie, Ind., wire, represented by Robert Miller.

Kellogg Switchboard and Supply Company, Chicago, telephone manufacturer, represented by K. B. Miller, F. J. Dommerque, F. W. Dunbar, A. E. Barker, C. P. Platt, S. C. Platt and Roy H. Manson.

Lindsley Brothers' Company, Chicago and Portland, Wash., cedar poles, represented by George L. Lindsley, president, E. A. Lindsley and J. A. Navarre.

Maltby Lumber Company, Bay City, Mich., cedar poles, represented by I. A. Maltby, president.

The W. J. Murdock Company, Chelsea, Mass., receiver manufacturer, represented by W. J. Murdock.

Monarch Telephone Manufacturing Company, Chicago, telephone manufacturer, represented by E. E. Yaxley, treasurer-general manager; J. C. Hubacher, vice president, and W. H. Trim, advertising manager.

Moon Manufacturing Company, Chicago, terminal heads, represented by H. E. Procunier, president; William Procunier, secretary, and T. H. Wood, manager sales department.

McRoy Clay Works, Brazil, Ind., conduits, represented by E. F. Kirkpatrick, western manager.

Monarch Electric and Wire Company, Chicago, supply house, represented by Henry Schwab, secretary.

Miller Anchor Company, Norwalk, Ohio, anchors, represented by C. H. Miller, president.

McDermid Manufacturing Company, Chicago, wire and cordage, represented by Charles L. Burlingham, president.

National Carbon Company, Cleveland, Ohio, batteries and carbon specialties, represented by M. H. Moffatt, assistant manager.

North Electric Company, Cleveland, Ohio, telephone manufacturer, represented by Charles H. North, president; F. F. Sapp, advertising manager, and L. G. Bowman.

New Haven Novelty Machine Company, New Haven, Conn., construction specialties, represented by H. Grant Thompson, president, and H. J. Minhinnick, western representative.

National Telephone Supply Company, Cleveland, Ohio, supply house, represented by F. P. Auxer.

E. E. Naugle Tie Company, Chicago, cedar poles, represented by A. T. Naugle.

W. G. Nagel Electric Company, Toledo, Ohio, supply house, represented by E. J. Paradis.

Ohio Valley Glass Company, Pleasant City, Ohio, glass insulators, represented by H. E. Cobb and C. O. Hatch.

Pittsburg and Lake Superior Iron Company, Escanaba, Mich., cedar poles, represented by H. W. Reade, secretary-treasurer.

John A. Roebling & Sons Company, Trenton, N. J., wire and cable, represented by George C. Bailey, western manager; W. H. Slingluff, W. P. Bowman, A. M. Whaley and A. G. Tingley.

Standard Telephone and Electric Company, Madison, Wis., telephone manufacturer, represented by James H. Parish, secretary-general manager.

L. W. Stanton, Cleveland, Ohio, consulting and electrical engineer.

Charles G. Stevens, Chicago, magnet steel and Norway iron.

Standard Underground Cable Company, Pittsburg, Pa., wire and cable, represented by F. S. Viele, W. W. Rogers, T. J. Pietzcker and J. R. Wiley, western manager.

Swedish-American Telephone Company, Chicago, telephone manufacturer, represented by E. B. Overshiner, president; A. V. Overshiner, vice president, and C. H. Macklin, general manager.

Stromberg-Carlson Telephone Manufacturing Company, Chicago and Rochester, telephone manufacturer, represented by Alfred Stromberg, president; F. L. Martin, advertising manager; J. J. Nate, E. L. Brown and G. C. Lewis.

Sterling Electric Company, Lafayette, Ind., telephone manufacturer and protective apparatus, represented by Henry A. Taylor, secretary-treasurer; F. E. Rotchka, advertising manager; H. T. Doolittle and Evan Shelby.

Lambert Schmidt Telephone Manufacturing Company, New York, telephone manufacturer, represented by Lambert Schmidt, president.

Turner Brass Works, Chicago, telephone specialties, represented by T. F. Farris, F. S. Binckley, P. Henderson and A. W. Straight.

Townsend Cedar and Supply Company, Chicago, cedar poles, represented by W. W. Townsend.

Telephony Publishing Company, Chicago, publisher TELEPHONY, represented by H. B. McMeal, president and editor; Ed J. Mock, secretary-treasurer; Elmer E. Smith, advertising manager, and G. I. Trace, associate editor.

Utica Fire Alarm and Telegraph Company, Utica, N. Y., municipal systems, represented by William P. Campbell.

The Valentine-Clark Company, Chicago, cedar poles, represented by E. H. Valentine, president; Ernest L. Clark, secretary- treasurer, and F. L. McGillan.

Varley Duplex Magnet Company, Philipsdale, R. I., coils and wire, represented by C. L. Hibbard, western manager.

Warner Electric Company, Muncie, Ind., ringing generators and pole changers, represented by T. W. Warner, president.

Williams Electric Company, Cleveland, Ohio, telephone manufacturers, represented by Joseph A. Williams, president.

Williams-Abbott Electric Company, Cleveland, Ohio, telephone manufacturer, represented by L. Sands, president.

Western Electric Supply Company, St. Louis, Mo., supply house, E. J. Nolke.

# Testing and Selecting Raw Material.

By H. M. DEAVITT.

It is noteworthy that the leading manufacturers are rapidly learning the value of knowing just what the raw material is that goes into the making of finished telephone apparatus. There is still too often a tendency to experiment with cheap substitutes in the hope of obtaining results as good as are to be had from the use of more costly materials; but manufacturers are learning that it does not pay. True, high-grade workmanship will conceal cheapness of material —before it is placed in service. A short time in service, however, will demonstrate the inefficiency of such a combination. Good material is just as essential as good workmanship, and the present intense competition is causing a general realization of this fact.

Magnet steel well illustrates the progress that has been made in the selection of raw material. Only a short time ago, if the names of the various metaloids to be found in steel had been mentioned to purchasing agents, they might have thought they were listening to a foreign language. Now it is common not only for the buyer to know the names of these metaloids, but he also knows what influence they have on the properties of steel, and to what extent they are allowable in order to make satisfactory magnets. He knows that it is the amount of carbon and manganese present which regulates the hardening of steel; that if there is not a large enough percentage of these elements present the steel will not harden sufficiently to retain its magnetism for any length of time, while if present in too large a quantity it interferes with the working qualities. Also he has found that phosphorus and sulphur are deleterious elements in steel, whose percentage should be as low as possible.

The same care is exercised in buying Norway iron as in the selection of magnet steel. For its various uses in the telephone it must be as nearly pure iron as it is possible to make it; for, unlike magnet steel, it must give up its magnetism instantly, and it is upon this property to a large extent that the delicacy of the finished instrument depends. This material should not contain more than one-tenth of 1 per cent of carbon and generally does not have any manganese, so that the hardening elements are reduced to a minimum, thus giving a very soft iron.

It is not the name or brand of the iron, but its chemical composition which gives to it its properties, good or bad. As no two heats of iron or steel are exactly alike, because the ores from which they are made vary to a considerable extent, and because of the chemical changes taking place during their manufacture, it is necessary, even if using steel from a furnace which in the past has furnished satisfactory material, to have each shipment analyzed and see that it meets the specifications required for such stock.

The steel manufacturer who rolls only a small percentage of his stock into magnet steel is not apt to appreciate the influence a slight change in the composition would have upon the magnetic qualities of his product, and he may supply material which would be excellent for other purposes, such as steel rails, etc., but entirely unfitted for electrical work.

There has been a great deal of experimenting done in the way of improving the quality of magnets, and a considerable quantity of tungsten steel has been used for this purpose. Nearly all of this steel is imported, as the manufacturers in this country have not been able to get the results obtained from that purchased abroad. This steel is considerably higher in price than the domestic stock, and its working qualities are widely different. Experience has shown that steel having about 5 per cent of tungsten gives the best results, and makes a magnet which is exceedingly hard and permanent.

In the buying of raw material for telephone manufacture great care should be exercised, as much of this material is expensive, and while competitors may offer what appears to be the same thing for a lower price it is well to be sure that such material is of equal value and is not adulterated either to such an extent as to make its use unsafe, or if it can be used, that the price is not too high for material for this grade.

The use of insulating material for copper wire may be cited as a further example. Italian tram silk is the most expensive material used to insulate wires and costs from eight to nine dollars a pound. A great deal of work has been done in trying to find a substitute for this material which can be produced at a lower price, but as yet no successful substitute has appeared in the market. Obviously, because such material is so expensive, the consumer desires to get as much as possible from each pound, to have that silk insulate as many feet of wire as possible. Common practice has shown that if such silk is properly made it should measure from 900 to 1,000 yards to the drahm. If the material is made up in such a way as to give only 800 yards to the drahm it is clear that there is a loss of more than 10 per cent on the minimum yardage required. Such a loss means that the cost of the insulated wire has increased 10 per cent.

The same may be said of the other materials used in insulating wire, although not as expensive as the train silk. A careful inspection more than pays for itself in the results obtained. Those who buy silk or cotton thread for insulating purposes without knowing its covering capacity cannot hope to succeed in competition with the firm that carefully analyzes each shipment and is constantly on the alert to give the mill any new ideas which will tend to increase efficiency or lower cost. It is by thus keeping in closer touch with the manufacturer and checking up each shipment to see that it is made as it should be that the best results are to be obtained.

In the use of paraffine wax for insulating purposes, it is not sufficient that the wax be simply white. The trade has advanced to such a point that its purity must be determined by the temperature at which it melts. It is known that the dryer it is—that is, the less oil it contains—the higher its melting point will be. The higher the melting point the harder it becomes, and as the harder wax absorbs less moisture, it acts as a better insulator.

The demand for purer chemicals is increasing, and although not used to a very large extent in the telephone business, yet the payment of a small increased price is warranted if in so doing better service can be maintained. It is not advisable to try to save a fraction of a cent a pound in buying sal-ammoniac, if in so doing the life of the battery in which it is used is shortened or its efficiency diminished. The proper working of the telephone is dependent upon the action of the battery, and with the best material attainable its life is none too long.

Nickel electrodes and its salts used in nickel plating furnish another opportunity for using discretion regarding purity. This material is found in the market in several grades, and is generally sold according to the percentage of nickel it contains. In the case of a grade with a low per-

centage of nickel a corresponding higher increase in impurities must be present, which may be of such a character as to tarnish the plating and give to it a darker luster. Buying the article containing the highest percentage of nickel at the same price per unit contained therein as in the cheaper grades is an excellent way of avoiding any bad effects.

The above examples show in a general way that it is necessary to know as much as possible regarding the raw material upon which much labor is to be expended, not only in order to make better goods, but also from a commercial standpoint in increased profits. The small country telephone shops speak still stronger of the advantages obtained from a careful inspection of purchases. Nearly all of these small plants of even two or three years' duration have a back room full of old transmitters, receivers, etc., which are faulty. This is the result of the manufacturer not having his raw material analyzed.

It is a mistake for concerns which buy materials in small quantities to feel that they cannot afford to have them tested. They need it more than the larger firms, as they have reputations to establish and must go into competition with those firms which insist upon analysis of each shipment received. It is the manufacturer that is careful and buys good material that is forging ahead, while the one that accepts the material his more exacting competitor rejects is seriously handicapped.

## TELEPHONES IN SWEDEN.

Probably the first thing which a visitor to Stockholm remarks after his arrival is the appalling number of telephones scattered about the hotel in the corridors and rooms. In his bedroom he will perhaps find one and just outside the door another. He cannot move twenty steps without discovering a new one. While when he goes out into the streets he will see little shelters, each of which holds an instrument. If his washerwoman does not send the linen back punctually he rings her up to ask the reason. If he wants company at dinner or lunch he invites a friend through the telephone. It is here, there and everywhere.

In Stockholm there are more subscribers to the telephone than there are in New York and Chicago together. It is used very advantageously in the rapid discharge of work by the state authorities. There are arrangements made by which telegrams, instead of being sent to the house, are communicated per telephone to the receiver direct from the postoffice. But the system is not confined to Stockholm. The whole of Sweden is covered with a network of cables and wires. At short notice it is possible to converse with Haparands, in the north, sixty miles beyond the railway terminus, or with Malmo, in the extreme south.

At the present time larger wires are being laid in the north. When this task is completed and the trunk lines are in full working order again it will be possible to carry on a conversation with the utmost ease between Victoria Hafen, on the Arctic ocean, and Moscow, Berlin or Paris. In short, the telephonic system of communication has been carried to the highest pitch of perfection in the Scandinavian peninsula. But even now it cannot be said that the system has attained its greatest dimensions, if one is to judge from last year's figures, from which it appears that no fewer than 12,000 fresh installations were made in Sweden, the majority in and around the capital.

Almost every village is connected by telephone with its nearest neighbors, even in such distant parts as Lapland. Thanks to the courtesy of the managing director of the General Telephone Company in Stockholm, I was enabled to obtain some interesting particulars of the size and working of this enormous system.

At the present time there are only two really big telephone companies in Sweden, the General Telephone Company and the National Telephone Company, a government concern. The former has about 33,000 subscribers, and its system is confined to a radius of seventy miles from Stockholm. Over the rest of the land the government has a monopoly of the telephones.

Within the seventy-mile radius of the capital there are only 12,000 subscribers to the government company, but outside the radius 50,000 more have joined the system. A certain amount of rivalry naturally exists between the two companies in Stockholm, with the result that the cost of the telephone is cheaper there than in any other city in the world.

The General Telephone Company charges eleven shillings for installation of the apparatus in a private dwelling, and thereafter an annual charge of £2. In business houses, where more than one instrument is required, the cost varies from £3 3s to £5 10s. The government, on the other hand, charges 15s per annum, and no installation fees, without any distinction between private dwellings and business houses. Both companies charge extra for long-distance communications, and also for connecting their own subscriber with a subscriber on the other company's list. Therefore, many people subscribe to both.

In Stockholm itself the General Telephone Company owns no fewer than 22,000 miles of double wires, and within the seventy-mile radius it possesses 7,500 miles more, most of which are laid underground in cables, each cable containing 250 double wires.

It is a fact worthy of remark that nearly all the cables are made in England or Germany, Sweden, in spite of her enormous telephone system, not having a single cable factory. But all the instruments, exchanges, etc., are manufactured by the world-famous firm of Ericcsson, so well known in connection with some of the largest systems in England.

The multiple lamp is the signaling system most favored in Stockholm, although experiments have been made and are still being made with the common battery system, which it is proposed to use in the new systems to be installed in Moscow and Warsaw by the Stockholm General Telephone Company. The central exchange-room of this company is the largest and most complicated in the world, since it contains no fewer than 20,000 drops.

By an ingenious arrangement, however, long-distance connections are made in a separate room, so that the conversations shall not be disturbed by passing through the main exchange room. This room, I may mention, is insured against fire for over £50,000, and has been in use for only the last three months. The original exchange room was destroyed by fire five years ago. Now special precautions have been taken to render everything in the room fireproof and prevent a recurrence of the disaster. The loss to the company by the fire was hundreds of thousands of pounds, as, owing to the dislocation of business, many subscribers were obliged to subscribe to the rival company.

In the exchange room one hundred girls are always at work. They are relieved four times a day. Everything is done by the company to make life comfortable. Two large sitting-rooms, furnished with lounges, easy chairs, pianos, etc., are provided for them when off duty, and a large, comfortable dining-room for their meals.

Last year the government tried to buy the General Telephone Company out. But parliament refused to vote the necessary three-quarters of a million sterling—a course which it will yet regret, as in 1930, when the concession expires and the government has the next chance to buy, the price will be much higher, as the business increases tremendously every year.

Handsome announcements heralded the completion of the Utica (N. Y.) Home Telephone Company's plant, which was opened for service June 11.

# THE SALE OF THE KELLOGG COMPANY

**Wallace L. De Wolf, president of the Kellogg Switchboard and Supply Company, acting with power of attorney granted him by Milo G. Kellogg, owner of the majority of stock in the Kellogg company, sold the controlling interest on January 4, 1902, to Enos M. Barton, president of the Western Electric (Bell manufacturing) Company. For reasons which may or may not be valid ones this sale was kept from the minority stockholders and the public until recently, when the minority stockholders brought suit to compel Enos M. Barton to restore the said controlling interest to Milo G. Kellogg. The suit is now pending and a statement of facts concerning the transfer of this stock has been furnished this publication by the minority stockholders, which is appended:**

STATEMENT FROM MINORITY STOCKHOLDERS.

The Kellogg Switchboard and Supply Company was organized in 1897 with Mr. Milo G. Kellogg of Chicago its president and principal stockholder. In the fall of 1901 Mr. Kellogg's health broke down and on about November 1st of that year he was obliged to entirely give up all business matters and left Chicago for California for an indefinite absence. Mr. Kellogg left the management of the Kellogg company in the hands of Mr. Wallace L. DeWolf of Chicago, who was then vice-president of the company, and entrusted with Mr. De Wolf a power of attorney for his entire personal property so as to provide for any financial emergency which might arise in his affairs and those of the Kellogg company during his absence. Prior to Mr. Kellogg's departure, a large amount of money had been expended in the increase of the plant of the company and an increase in the capital stock of the company to meet the expenditure that was in progress, and a certain large customer and debtor of the company was in a percarious financial condition.

Shortly after Mr. Kellogg's departure, or about January 4th, 1902, Mr. De Wolf sold Mr. Kellogg's entire interest in the Kellogg company, amounting to about two-thirds of the entire capital stock of the company, to Mr. Enos M. Barton of Chicago, president of the Western Electric Company, and representing as is understood the Bell telephone interest. This sale was made without Mr. Kellogg's knowledge or consent and Mr. Kellogg was not advised of the sale of his stock until six months thereafter. At the same time Mr. De Wolf sold his own stock, amounting to 202 shares, in the Kellogg company and effected the sale also to the same party of the stock owned by Mr. Clarence Buckingham of Chicago, a director in the Kellogg company. No other director, officer, employe or stockholder of the Kellogg company, save the secretary, was advised of the sale, and none of them knew of the sale until more than a year thereafter. No record of the transfer of stock was made on the books of the Kellogg company, and all employes, and particularly those connected with the sales and engineering departments, were given the most positive assurance that there was no truth in the rumors that the Kellogg company was controlled by the Western Electric interest.

On July 4th, 1902, six months subsequent to the sale of his stock, Mr. Kellogg, having sufficiently recovered his health to inquire into the affairs of the Kellogg company, was advised by Mr. De Wolf that his stock had been sold to Mr. Barton. Acting upon the advice of his counsel, Judge R. S. Taylor, Mr. Kellogg, as soon as his health permitted, began negotiations through his counsel with Mr. Barton, and with Mr. Frederick P. Fish, president of the American Telephone and Telegraph Company, for the repurchase of this stock. These negotiations have continued without interruption since the first of October, 1902, to the present time. Up to about the first of this year there was every prospect of these negotiations being successful, and that Mr. Kellogg would again obtain possession of his stock and the controlling interest in the Kellogg Switchboard and Supply Company, so that he could again control the management of the Kellogg company and could assure his friends and its customers that their interests would be protected and all of the obligations assumed by the Kellogg company fulfilled to the letter. About the first of the year, however, Mr. Barton advised Mr. Kellogg and his counsel that it had been definitely decided to reject all propositions for the repurchase of his stock and that any additional price which Mr. Kellogg might offer for said stock would not affect the decision in this matter. Mr. Kellogg had already offered to repurchase his stock at a price which would net a large profit to the original purchaser.

Mr. Kellogg then appealed to the Bell interest to reconsider the matter from an ethical standpoint, that is, from the standpoint of the damage which would result to his friends and customers and employes of the Kellogg company who had been placed in a false light by the action of both parties concerned in the sale of his stock. To this appeal the Bell interest also turned a deaf ear.

On the first day of March, 1903, Judge R. S. Taylor informed Mr. F. W. Dunbar of the condition of the Kellogg company and its relation to the Bell interest. Mr. Dunbar was the first employe of the Kellogg company to be informed of the existing situation, and he immediately took up the matter with Mr. Kellogg, who placed the entire correspondence and records of the negotiations at his disposal, and explained all details of the situation. The situation was discussed and examined with the object of finding some way to insure the protection of the customers of the Kellogg company in the future as they had been protected in the past. Legal advice was again sought, and it appeared that the minority stockholders of the Kellogg company could secure legal redress and by so doing could insure the protection of the customers of the Kellogg company, and the fulfilling of its obligations to the Independent telephone business.

On May 19th, 1903, Mr. Kempster B. Miller and Mr. F. J. Dommerque of the Kellogg company were for the first time made acquainted with the situation and with Mr. Dunbar decided to bring suit against Mr. De Wolf, Mr. Barton, Mr. Fish, the American Telephone and Telegraph Company and the Western Electric Company for the recovery by Mr. Kellogg of his stock and to restrain the Bell interests from disposing of the stock until it could be returned to its rightful owner and from voting said stock to control or influence the management of the Kellogg company or from influencing in any manner the management of said company, or from interfering with any of the patent suits now pending against the Kellogg company and its customers.

The suit was brought in the circuit court of the state of Illinois, on Friday, June 5th, 1903, by Henry S. Robbins, Esq., attorney for the minority stockholders, and on that day Judge Tuley of that court granted a preliminary injunction to the above effect. Mr. W. W. Dean of the Kellogg company and other minority stockholders joined in the suit.

The suit brought by the minority stockholders of the Kellogg company is not only in the interest of these stockholders, but is primarily in the interest of the customers of the Kellogg company. The most eminent counsel available has been secured and the minority stockholders are confident that the Bell interest will be permanently barred from influencing the management of the Kellogg company, and also that the sale of the stock will be nullified and Mr. Kellogg reinstated to active management.

The present situation is one in which the customers of the Kellogg company may now feel assured that their interests will be fully protected by the Kellogg company under its old management.

The following is the separate answer of Wallace L. De Wolf, one of the defendants to the bill of complaint of Francis W. Dunbar, Kempster B. Miller, Franz J. Dommerque, William W. Dean, Joseph C. Belden, Mrs. Amanda W. Belden, Anna A. Poole, George L. Burlingame and Francis D. Kellogg, complainants.

ANSWER OF WALLACE L. DE WOLF.

*State of Illinois, County of Cook, ss: In the Circuit Court of Cook County, Francis W. Dunbar et al. vs. American Telephone & Telegraph Company et al., in Equity. No. 239,845.*

This defendant, saving himself all benefit of exception to said bill for the many errors, uncertainties, and imperfections thereof, for answer thereto, or to so much thereof as he is advised is material to be answered unto, answering says:

1. He admits that the Kellogg Switchboard & Supply Company (designated in said bill and hereinafter as the Kellogg Company) is a corporation of the State of Illinois, organized for the purposes set forth in said bill, and having a capital stock of five thousand shares of the par value of $100 each. He further says that, with reference to the corporate and commercial history of said Kellogg Company, the extent and quality of its manufactured product, the amount of its sales, and other matters associated therewith, the allegations of the bill are, in their general scope and purport, true, but with many errors of detail. He admits that said Kellogg Company is and has been a large and successful manufacturer of electrical, and especially of telephone, apparatus, and that its customers

have been largely persons and corporations interested in the so-called Independent telephone movement. And he leaves the complainants to make such further proof of their averments in that behalf as they may be advised.

2. As to those averments of the bill which relate to the history, organization, business, and connections of the American Telephone & Telegraph Company, and the Western Electric Company, this defendant has no personal knowledge sufficient to enable him either to admit or deny said averments, and he calls upon the complainants to make such proof in that behalf as they may be advised.

3. This defendant admits that he is and has been a director of the Kellogg Company since its organization, and was formerly Secretary, then Vice-President, and is now President of said company; that the averments contained in paragraph 1 of said bill with reference to the record ownership of stock immediately prior to January 4, 1902, are correct; and that the averments in that behalf contained in paragraph 13 of said bill are correct, except that defendant Milo G. Kellogg then owned 3,306 shares, instead of 3,307 as alleged; that 992 shares, instead of 993, as alleged, stood on the books in the name of this defendant; that this defendant owned 203 shares, instead of 202 shares as alleged; and that Mrs. Katherine W. Wright owned 12 shares, instead of 13 shares as alleged.

4. And as to those parts of said bill which relate to the sale of stock in said Kellogg Company formerly belonging to the defendant Milo G. Kellogg, and the proceedings which are alleged to have occurred since such sale, this defendant denies each and all of said allegations, except as hereinafter admitted, and says that the facts in that regard are as follows, and not otherwise, to wit:

During the year 1901, and prior years, the Kellogg Company had sold large quantities of switchboard and telephone supplies to various persons and corporations connected with and controlled by a group of persons known as the Everett-Moore Syndicate, whose headquarters were at Cleveland, Ohio, and early in December, 1901, the indebtedness of such companies and persons (which, for brevity, is hereinafter spoken of as the Everett-Moore indebtedness) to the Kellogg Company amounted to more than $275,000, nearly all of which was in the form of notes, and of these notes about $222,000 had been discounted at various banks upon the guaranty of the Kellogg Company, and not less than $93,000 thereof upon the personal guaranty of Milo G. Kellogg. At the same time the indebtedness of the Kellogg Company in accounts and bills payable, was in excess of $394,000 upon not less than $169,000 of which Milo G. Kellogg had made himself personally liable as guarantor, and for part of which stocks and securities of said Milo G. Kellogg, covering a large part of his private fortune, were pledged as collateral. That in said month of December, 1901, the Everett-Moore Syndicate and its constituent and subordinate concerns were in serious financial straits, and unable to meet all or any considerable portion of their said indebtedness to the Kellogg Company, and their affairs grew increasingly complicated and unsatisfactory, and the prospect of realizing anything in the near future from that source grew increasingly slight; while, at the same time, the creditors of the Kellogg Company and the banks with whom the Everett-Moore paper had been discounted were pressing for payment of their claims, and, while the Kellogg Company, aside from its contingent liability on discounted paper but amounting to over Two hundred and twenty thousand ($220,000) dollars was substantially solvent, its financial position was one of the most imminent peril and required the ablest and most skilful attention from its officers to preserve its credit and save it from ruin.

Defendant further shows that during the year 1901, said Milo G. Kellogg, who was then the President of the Kellogg Company, became so seriously impaired in health and in ability to transact business that it became necessary about November 15, 1901, for said Kellogg to abandon all attempt to transact business and to leave the City of Chicago and go to California for complete freedom from business care. That on at least two previous occasions, at intervals of several years, said Kellogg had suffered from similar impairment of health, and said Kellogg himself and his nearest friends considered it doubtful whether his health, or even his life, could be saved on the occasion of this third attack. That this defendant is the brother-in-law of said Milo G. Kellogg, being the brother of Frances D. Kellogg, who is the wife of said Milo and one of the complainants in this cause; and by reason of this relationship, among other things, said Milo G. Kellogg, before leaving Chicago, gave to this defendant a general power of attorney to act for him in all business matters, as he had done on many previous occasions, and requested this defendant, who was then Vice-President of the Kellogg Company, to assume the management of said Company in place of said Milo G. Kellogg, and conduct its affairs to the best advantage of all concerned. That the defendant Leroy D. Kellogg, who is the son of said Milo G. Kellogg, was then and still is the Secretary and Treasurer of the Kellogg Company; and that this defendant counseled fully and freely with said Leroy, and with Clarence Buckingham, a director and one of the members of the Executive Committee of said Kellogg Company in and about the sale of stock, and all the matters herein referred to, and took no step without the full knowledge and approval of said Leroy. That from and after the departure of said Milo G. Kellogg from Chicago, no conference could be had with him on any matter of business, by reason of the condition of his health as above described. And this defendant says that the disability of said Milo G. Kellogg largely increased the embarrassment of the commercial situation in which the Kellogg Company was placed, and that the commercial pressure upon the Kellogg Company, in its turn, furnished elements of great danger to the personal fortune of said Milo G. Kellogg, which, as well as the fortunes of the Kellogg Company, this defendant was in duty bound to protect and conserve to the best of his ability.

This defendant shows that in the pressure and embarrassment thus created, various possible methods of relief were discussed and considered by this defendant, especially with said Leroy D. Kellogg, and Clarence Buckingham, and some time early in December, 1901, said Leroy suggested to this defendant that application be made to Enos M. Barton, who had been for many years a friend and business associate of said Milo G. Kellogg, and President of the Western Electric Company (of which said Kellogg then was and for many years had been a stockholder to a very large amount), with a view to the possible purchase by said Barton of said Milo G. Kellogg's stock in the Kellogg Company. That, upon consideration and further conference, this suggestion of Leroy D. Kellogg seemed not only advisable but the only plan that promised any degree of success, the Kellogg Company having made no profit the previous year, and the Everett-Moore Syndicate having suspended payment. And thereupon, with the knowledge and approval of said Leroy and of said Buckingham this defendant approached said Barton and suggested to him the purchase of all or part of said Milo G. Kellogg's stock in the Kellogg Company. And he says that, until so approached neither said Barton nor any other person associated or interested with him had mentioned or suggested to this defendant, or to any other person, to his knowledge, the sale of said Kellogg's stock to said Barton, or to the American Telephone & Telegraph Company, or to the Western Electric Company, or to any one connected with either of them.

Upon first being approached, said Barton hesitated and took the question under advisement, and the negotiation extended over a period of some weeks, during all of which time this defendant was in consultation with said Leroy D. Kellogg, who expressed his approval of all that was done. That on or about January 4th, 1902, an agreement was reached between this defendant and said Barton, which agreement was in writing, and is in words and figures as follows:

This agreement made this fourth day of January, 1902, between Enos M. Barton, party of the first part hereinafter designated as seller, and Wallace L. DeWolf, party of the second part hereinafter designated as buyer, witnesseth:

That said seller hereby agrees to sell and deliver to said buyer not less than two thirds (⅔) of the total shares of stock of the Kellogg Switchboard and Supply Company, a corporation organized under the laws of the State of Illinois: and said buyer agrees to pay the sum of $45.00 per share for said shares and also for any and all other shares offered by said seller to said buyer. Said buyer agrees to pay for said shares at the rate of $45.00 per share in cash upon the delivery of the certificates for the same and also to pay in addition to the above price for each and every share so offered to said buyer, the pro rata proceeds of any and all bills and accounts receivable due and owing to said Company on Dec. 1, 1901, as shown by the attached statement amounting to $323,248.09, the same to be settled and paid to said seller, as the same are paid and collected by said Company after said Dec. 1, 1901, and from time to time thereafter upon the request of said seller.

2. All bills discounted by said Company and outstanding on Dec. 1, 1901, being the amount of $251,464.69, as per said schedule attached are to be taken up by said seller and the assets of said Company saved harmless therefrom. The seller guarantees that the contingent liabilities shall not exceed the above amount as of Dec. 1, 1901.

3. The said seller guarantees that the direct liabilities of said Company on the date of Dec. 1, 1901, do not exceed the amount of $341,678.23, as shown on statement hereto attached.

4. Whereas Milo G. Kellogg has given to the Corn Exchange National Bank and to the Merchants Loan and Trust Bank his personal guarantee for any and all liabilities of the Kellogg Switchboard and Supply Company to said Banks, the amount due said Banks under this agreement being $169,000.00, as of Dec. 1, 1901,

Now, therefore, it is agreed by said buyer to save the said Kellogg harmless from said guarantee and said buyer agrees that the debts to the said Banks shall be paid wthin one year in order that said guarantee may be taken up and cancelled, said buyer also agrees that this guarantee to save said Kellogg harmless from the said guarantee to said banks shall continue and be in force as to the liabilities of said Kellogg Switchboard and Supply Company, contracted on and after Dec. 1, 1901, until said liabilities have been paid and the guarantees of said Kellogg cancelled. It is agreed, however, that the amount of indebtedness to said banks existing on Dec. 1, 1901, shall not be increased above said amount without the written consent of both parties to this agreement.

5. It is further agreed that said buyer shall take and pay for all

stock offered him under this agreement between January 15, 1902, and January 15, 1903.

6. The parties hereto mutually agree that the business of said Company shall be carried on in the usual manner for the space of one year so that all bills and accounts receivable, due on Dec. 1, 1901, can be collected and in the usual course of business. It is agreed that all contracts in course of completion shall be consummated so that the guarantors on behalf of said Company shall be saved harmless from liability thereon.

(Signed) WALLACE L. DEWOLF,
ENOS M. BARTON.

STATEMENT, DECEMBER 1, 1901.

| | | |
|---|---|---|
| Bills receivable on hand | | $ 68,802.17 |
| Accounts receivable a/cs | $245,695.92 | |
| Bonds—actual value | 4.250.00 | |
| Due on subscriptions | 4,500.00 | 254,445.92 |
| Cash on hand, in office | 666.52 | |
| In banks | 64,882.25 | 65,547.78 |
| | | $388,796.86 |
| Inventory complete but subject to final verification | | $ 625,000.00 |
| 25% for patents and good will | | 125,000.00 |
| | | $1,138,796.86 |
| Liabilities: | | |
| Accounts Payable, a/cs | $128,655.62 | |
| to officers and employes | 12,231.49 | $ 140,886.92 |
| Bills Payable, to Banks | $169,00.00 | |
| To Firms | 31,791.31 | 200,791.31 |
| | | $ 341,677.23 |
| Capital stock | | 500,000.00 |
| | | $ 841,678.23 |
| Contingent Liabilities, | | |
| Bills Rec. discounted $251,464.69 | | |
| Recapitulation: | | |
| Total Assets | | $1,138,796.86 |
| Total Liabilities | $841,678.23 | |
| Surplus | 297,118.63 | 1,138,796.86 |

And this defendant shows that the sale and change in ownership of said stock was not be disclosed at the special instance and urgency of this defendant and the said Leroy D. Kellogg, said Leroy particularly insisting that, if the change of ownership should become known, it might so affect the Everett-Moore Syndicate as to impair and perhaps wholly destroy the chance of collecting the amounts due from said syndicate and its associate bodies to the Kellogg Company as aforesaid to the great injury of the said Milo G. Kellogg and said Kellogg Company. And that, since July 4, 1902, when said Milo G. Kellogg became aware of what had taken place, as hereinafter set forth, the sale of said stock has been kept secret with the knowledge of said Kellogg with the hope that said Kellogg might regain the control of all or part of his stock or return to his former position as President of the Kellogg Company; that up to the present time no part of the said indebtedness of the said Everett-Moore Syndicate has been paid by said syndicate.

This defendant further says that, in all the negotiations for such sale, and in the sale itself, he met and knew no one as purchaser except said Barton; that, so far as this defendant was concerned, said Barton personally assumed the obligations of the agreement, and this defendant cannot state whether said Barton in the transaction was acting for himself or for any other person or company. That the sole purpose and effort of this defendant in the whole transaction was to relieve, as far and as promptly as possible, the serious financial peril of said Milo G. Kellogg and the Kellogg Company; that he was influenced in part by the probability, which then seemed almost a certainty, that said Milo G. Kellogg would never be able to resume active participation in business; and that long after said sale, and with full knowledge of all the circumstances, not only said Milo G. Kellogg expressed repeatedly to this defendant his confidence that defendant had acted as he believed at the time to be for the best interests of all concerned, but that said Kellogg's private counsel, the Hon. R. S. Taylor of Fort Wayne, has repeatedly and very recently expressed in writing the opinion that this defendant had done in entire loyalty to said Kellogg the thing which seemed at the time the only thing that could be done. That during the negotiations the question of the future conduct of the business was discussed between this defendant and said Barton, and this defendant was advised that it was the desire of said Barton that the business of the Kellogg Company should be continued under the management of its old officers and employes, that contracts be fulfilled, new work solicited and the business of the Company developed to the highest possible success.

This defendant further says that since the sale of said stock, and at all times down to the present time, the affairs of the Kellogg Company have continued under the management and control of the same persons who were its officers and directors prior to such sale, with the exception of said Milo G. Kellogg, this defendant having become President instead of Vice-President, and Emerson H. Brush, who was previously a director, having been elected Vice-President, and said Leroy D. Kellogg continuing as Secretary and Treasurer. That this defendant, as the chief executive officer of said Company, in conference with his associates in office, has endeavored in all respects to conduct the business for the sole interest and advantage of the Kellogg Company, and that at no time and in no respect has the policy of the Kellogg Company been dictated or even suggested by said Barton or any person or corporation (if such there be) whom he represents other than himself, except that said Barton has from time to time at the request of this defendant given valuable advice on certain purely commercial questions, and at all times has expressed to this defendant his desire that the affairs of the Kellogg Company should be conducted on the best lines to make it in all respects a commercial success, and, as for suggestions in detail, said Barton has from time to time refused to make them, and has insisted that this defendant should act upon his own judgment in all matters of administration.

Particularly was this the case in respect to the internal rearrangement of departments and duties in respect to which said bill alleges that the authority of the complainant Dunbar has been improperly curtailed to the detriment of the Kellogg Company, whereas, in fact, this defendant says that it was upon his own judgment and with the distinct approval of the complainants Dean, Miller, and Dommerque, that the rearrangement was made; defendant being of the opinion then and now that the especial usefulness of said Dunbar to the Kellogg Company lay along different lines than those which he had been following, and that the interests of the Kellogg Company would be subserved by giving said Dunbar special charge of the matters relating to patents and defense of suits, while said Dommerque should have charge of the engineering and installations, said Dean of the designing of apparatus, and said Miller in the capacity of engineer, patent expert and the general direction of the sales department; and this defendant says that said change and reorganization has resulted in accordance with his expectation and has proved greatly beneficial to the interests of the Kellogg Company.

This defendant shows that the business record of the Kellogg Company during the year 1902 was by far the best in its history, not only with respect to the amount and profitableness of sales, but to the quality of the work turned out, the comparative freedom from complaints, and the general reputation and standing of the Company among purchasers, and that whereas, for the eleven months ending December 1st, 1901, when this defendant assumed control of said business the reports of the auditors, allowing practically nothing for depreciation, showed a nominal profit of only $32,053.58, made largely from the profits of the pole business, the succeeding thirteen months ending January 1st, 1903, as shown by the reports of the auditors after writing off $109,858.58 for depreciation, shows net profit of $205,778. That there has not been at any time, to the knowledge of this defendant, any hint or suggestion on the part of any stockholder or person interested in the stock of the Company, that its affairs should be conducted otherwise than in its own interest and with the desire and effort to make its business profitable and permanent; and this defendant believes that, unless prevented by the course of the complainants in filing said bill, the business of the Kellogg Company will continue to be profitable and prosperous.

With reference to the patent litigation mentioned in said bill, this defendant has no knowledge or information as to the reasons of the American Telephone & Telegraph Company or Western Electric Company for commencing or delaying the commencement of any patent suit. But he says that since the date of sale of said stcok only one suit has been commenced by either of said companies against the Kellogg Company and three against its customers, so far as this defendant is advised. That in all of said suits the Kellogg Company has retained the Hon. R. S. Taylor of Fort Wayne, Indiana, who has been for many years its counsel in patent matters, and who is regarded by the legal profession as a patent lawyer of the very highest grade of ability and of unquestioned integrity; that said Taylor has been instructed to carry on the defense of said cases by every legitimate means at his command, and is so doing, as far as this defendant is advised; that some of said cases have not yet made substantial progress, but that in the one other case, covering an alleged improvement in condenser, the said Judge Taylor has interposed a defense, which, as defendant is informed and believes, is regarded by the complainant in said suit as unanswerable, and said suit is considered virtually defeated and disposed of.

This defendant further says that, since the sale of the said stock, and while this defendant has been in charge of the affairs of the Kellogg Company, a suit previously pending at St. Louis, Missouri, resulted in a decree against the Kellogg Company with respect to a certain device known as an answering jack; whereupon this defendant, with the aid of the counsel and the experts of the Kellogg

Company, and particularly with the assistance of said Dunbar, devised and manufactured a substitute for said device, and had the same ready for installation and it was successfully installed within the time limited by the decree of the Court.

This defendant says that at no time has he or the Board of Directors of the Kellogg Company had in contemplation the dissolution of said Company, but rather, as above stated, its continuance and growth; that all contracts are being fulfilled and bonds given for their completion where required, and that new contracts are being solicited and secured as far and at as profitable rates as possible; that no bids have been made for work at unduly low prices for the purpose of underbidding the Stromberg-Carlson Company, or otherwise; and that said Milo G. Kellogg has repeatedly advised this defendant on business matters relating to the company, and that such advice has been carefully followed in all instances.

This defendant further shows that about the 4th of July, 1902, said Milo G. Kellogg, unexpectedly to himself and his friends, had in a measure recovered his health, and was able to come to Denver, Colorado, where this defendant together with Leroy D. Kellogg met him and reported to him fully what had been done during the previous months; that said Kellogg neither then nor since complained that this defendant had exceeded his authority, or suggested that this defendant had acted otherwise than in entire good faith and for what he conceived to be the best interests of said Kellogg; that said Kellogg expressed regret at the existing situation, and was exceedingly anxious to regain control of the Kellogg Company or even a minority interest therein, and to that end used with this defendant, and later with said Barton, various arguments and persuasions. This defendant urged upon said Kellogg, first, as the affairs of the Everett-Moore Syndicate were still in a critical and unsettled condition, and that it was still uncertain whether said Kellogg would be in a condition of health to permit his engaging actively and permanently in business, and second and especially, that the transaction having been made in good faith and having been abundantly justified at the time by the financial conditions of said Kellogg Company and said Kellogg, and especially by the state of said Kellogg's health, and said Barton having furnished the money and taken the risk which had resulted in escaping the financial perils, that there was no sufficient reason why said Barton should then be called upon to surrender the purchase that he had made unless he desired so to do, but on the other hand this defendant states that he used his utmost endeavors, and urged said Kellogg to accept the offers of said Barton, so that said Kellogg might return to the management of said Company. But this defendant is not familiar with all that passed between said Kellogg and said Barton and others in that regard, and does not undertake to state the same fully, both for lack of detailed information and because he is advised that such conferences and negotiations are immaterial to the issues presented in this cause. But this defendant is informed that said Kellogg was fully advised by his counsel, Judge Taylor, that any negotiations on his part to repurchase stock from said Barton would amount to a waiver and abandonment of any possible rights which said Kellogg might have to challenge the validity of said Barton's purchase, and that, with such knowledge and advice, said Kellogg did enter upon such negotiations, but, as this defendant is informed and believes, without success. And this defendant further says that, so long as said Kellogg was in negotiation for, and was hopeful of securing either the control or a substantial minority interest (leaving the majority interest in the hands of said Barton) in the Kellogg Company, he was willing to continue and did continue the policy of silence as to the change of ownership of the stock and only departed therefrom after the filing of the Bill of Complaint herein.

This defendant says that the agreement of January 4, 1902, between said Barton and this defendant acting for said Kellogg has been performed, and that said Kellogg has received and accepted the proceeds therefrom; that a subsequent adjustment of accounts has taken place between the parties thereto, and a full and complete statement arrived at, which was embodied in a subsequent contract dated April 22, 1903, which was executed by this defendant for said Kellogg, with the full and personal consent and approval of said Kellogg, and the consideration for said stock as provided in said contract has been fully paid.

This defendant further says that his personal interest in the Kellogg Company has at all times been relatively small, that his salary from said Company is not a matter of controlling importance, and that his actions in all matters above referred to have been influenced solely by the desire to protect said Kellogg and the members of his family, as well as to promote the welfare and prosperity of the said Kellogg Company.

And having fully answered said bill, this defendant prays to be hence dismissed with his costs in that behalf most wrongfully sustained.

WALLACE L. DEWOLF.

TENNEY, COFFEEN & HARDING,
Solicitors, and of Counsel.

State of Illinois, County of Cook.—ss.

Wallace L. DeWolf, being duly sworn, on oath says that he is a defendant in the above entitled cause; that he has read the foregoing answer, and knows the contents thereof, and that the statements therein contained are true, except as to such averments as are therein stated to be on information and belief, and as to such matters, he believes it to be true.

WALLACE L. DEWOLF.

Subscribed and sworn to before me this 22d day of June, A. D. 1903.

BERNICE C. CAUGHEY,
Notary Public.

(SEAL.)

## THE NEW YORK CONVENTION.

The adjourned annual meeting of the New York State Independent Telephone Association met in convention at the Butterfield house in Utica June 10, transacted its business and in the evening adjourned. With but one exception all the companies having membership were represented. Among the places sending delegates were Buffalo, Rochester, Syracuse, Auburn, Jamestown, Gloversville, Albany, Utica, Herkimer and Binghamton. The most notable action taken was that by which the Buffalo association became united with the state body. Both of these organizations were formed at Rochester in July last. The Independent companies went to Rochester at that time for the purpose of establishing one state association, but through a dispute between rival toll lines two were born. Now the breach is healed over and both factions seem to feel pleased. The action thus taken must, however, be submitted to the individual companies for ratification.

The afternoon session was held beginning about 2:30 o'clock. The resolution uniting the rival associations was offered and was adopted. It was to the effect that "all members of the Buffalo association hereby become and are made members of this association, subject to the ratification of the respective companies," and, also, "that all Independent companies represented in the convention become and are hereby made members of the association, subject to the ratification of their members or boards of directors."

A nominating committee, appointed by the chair, presented its report, and upon its recommendations the following officers were elected: President, George R. Fuller of Rochester; first vice-president, Howard Hendrickson, Albany; second vice-president, J. H. Scofield, New York city; secretary and treasurer, J. B. Ware, Buffalo. The following executive committee was named: Hon. H. H. Persons of Buffalo, B. G. Hubbell of Buffalo, S. B. Rawson of Niagara Falls, Edward Davis of Binghamton, T. Harvey Ferris of Utica, J. S. G. Edwards of Gloversville, J. S. Bailey, Jr., of Herkimer and T. S. Lane of Jamestown. Charles H. Poole of Utica and C. O. Harris of Rochester were made inspectors of election.

A committee consisting of Messrs. McDowell, Hendrickson, Carey, Aiken and Barber was appointed on the matter of amendments to the constitution.

An invitation was received from T. Harvey Ferris to attend a reception at 7:30 p. m. in the new building of the local company on Elizabeth street.

In connection with the consolidation of the state and Buffalo associations, Martin Carey, attorney for the Frontier Telephone Company of Buffalo, made a felicitous speech in which he expressed his satisfaction at the action that had been taken. He was followed by the manager of the same company, ex-Senator H. H. Persons. Mr. Potter of Syracuse read a paper on the subject of uniformity in toll service, and J. B. Ware of Buffalo spoke on the development of the Independent telephone business.

The evening session was a brief one. The committee on amendments to the constitution reported, and its report was adopted. The amendments provide that the annual meeting be held on the first Thursday in June and that the annual dues be payable on the first of January.

# The Handling of Supplies and Material.

By William H. Hyde.

To illustrate the plan I am about to describe, I will take up the subject under the following headings: Requisitions, Invoices, Register Record, Invoice Record, Stock Ledger, Exchange Ledger, Exchange Manager's Monthly Inventories of Materials Received and on Hand, and Monthly Report of Materials Used.

*Requisitions (Orders)*—Under this heading, the first thing to be taken up is the storekeeper's requisition on the

_____TELEPHONE COMPANY

SUPPLY DEPARTMENT

_____190__

Mr._____

_____

Dear Sir: We require the following material for stock. Please order for immediate delivery, and oblige

_____Storekeeper.

| Material and Amount Required | Amount on Hand | Average Consumption in Thirty Days | Remarks |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

FIG. 1.

general superintendent for supplies needed to replenish his stock.

Once a month the storekeeper should go over his stock and make an order on the general superintendent for what staple materials, such as line materials, interior equipment supplies, battery supplies, etc., he will need to carry him along for the coming month, in a general way, basing his order on what was used during previous months. For supplies other than the above special requisitions can be made.

Goods Rec'd.....
Bill Rec'd.....
For .....
Prices O Kd.....
Extension O Kd.....

FIG. 2.

The requisition should be made in duplicate, and a copy kept on file by the storekeeper, so that the duplicate may be attached to the invoice for the goods when received. See Fig. 1 for form to be used for this purpose.

***Register No.***_____

FIG. 3.

*Invoices.*—These are the itemized bills from the dealers from whom the goods are purchased. Dealers should be requested to make these bills in duplicate and give number of the requisition ordering the material, so that the bills may be readily checked with the requisitions. The duplicate copies are for the storekeeper's files. The originals, after being checked with the goods received, to see if correct, should be stamped as shown in Fig. 2.

*Goods received* (show date); *bills received* (show date); *for* (show what account to be charged to—stock, estimate No., etc.); price O. K. (should be indicated by the storekeeper's initials); extensions checked (should show bookkeeper's initials).

After all this information is gathered and entered upon both the originals and duplicates, they should be stamped

REGISTER RECORD

| Register Number | Date of Bill | From Whom Purchased | Date Received | Amount of Bill |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

FIG. 4.

with the register number (see Fig. 3) and the material entered on the stock ledger. Then the originals should be sent through to the general office for payment, the duplicate copies, with the duplicate requisitions, to be kept on file by the storekeeper, according to the register number, for future reference.

*Register Record*—This book is used for the purpose of

INVOICE RECORD

| Date of Bill | From Whom Purchased | Amount of Bill | Register Number |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

FIG. 5.

keeping track of the numbers, consecutively, that are stamped on the invoices, so that an invoice can be located instantly. See Fig. 4 for a sample page of book—the length or breadth of page optional.

*Invoice Record.*—After the register number is stamped upon the invoices they should be entered in the invoice record. This is a book that is indexed, and is used for the

_____TELEPHONE CO. Requisition for Material and Instruments

_____Exchange. Date_____190__ Order Number_____

To the General Superintendent. Entered_____190__

The following supplies are needed at this Exchange:

| | Quantity | Material | For what purpose | Price | Amount |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

Approved _____ Gen'l Supt. Storekeeper_____

The above material shipped

_____190__ Manager _____

FIG. 7.

purpose of keeping each firm's bills together, to expedite the checking up of monthly statements. See Fig. 5 for a sample page of the book—the length or breadth of page to be optional.

The register record and invoice record may be combined, if desired, by having the register record indexed for the

firms' names. The objection to this, however, is that when checking up monthly statements it will be necessary to jump around to find the different invoices.

*Stock Ledger*—After the invoices are all checked up and found to be correct they should be entered on the stock ledger, a page being used for each article. (See Fig. 6 for sample page.) By using this form of ledger, the storekeeper has a complete record of each kind of material in stock, and can tell at a glance just how much he has on hand at *any time*.

All goods received or returned are entered on the debit side, and all the shipments on the credit side of the ledger.

*Exchange Ledger*—In this ledger are entered all shipments, etc., of material to be charged to the different exchanges, for which the storekeeper has received requisitions. (See Figs. 7 and 8 for form for requisition and packing slip.) A page of this ledger is used for each exchange, each estimate, or account. See Fig. 9 for sample page—length and breadth of page optional.

If material is to be shipped to an exchange, enter the

DR. CR.

ITEM_____ SHIPMENTS

| Year | ORDERED | | | RECEIVED | | | | | RETURNED | | | *JANUARY | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Requisition Number | Date | Quantity | Date | Requisition Number | Quantity | Price | Amount | Quantity | Price | Amount | Date | Quantity | Price | Amount |
| | | | | | | | | | | | | 1 | | | |
| | | | | | | | | | | | | 2 | | | |
| January | | | | | | | | | | | | 3 | | | |
| | | | | | | | | | | | | + | | | |

NOTE: Each page made for the entire 12 months.
* NOTE: To be filled out for the balance of the year.
+ NOTE: To be filled in for 31 days.

FIG. 6.

_____TELEPHONE CO.

Material Record for_____

| Date | Order Number | MATERIAL TO BE CHARGED TO STOCK, ETC | | | | | | Credit Slip Number | MATERIAL USED AND RETURNED | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Quantity | Kind | @ | From Warehouse | From Other Sources | Total | | Quantity | Kind | @ | Maintenance | Const. Aerial: New Subscribers | Const. Aerial: Increased Facilities | Const. Equip.: New Subscribers | Const. Equip.: Increased Facilities | Material returned or transferred |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

FIG. 9.

_____TELEPHONE CO.

Monthly Inventory of Materials Received and On Hand at_____Exchange during_____190__

| MATERIALS (Note alphabetically) | Quantity on Hand 1st of Month | Check Col. | RECEIVED: From Storekeeper | RECEIVED: From Subscribers, &c. | USED AND SHIPPED: Used During Month (See details) | USED AND SHIPPED: Shipped to ..... | Balance on Hand at end of Month | Check Col. | These columns for use of the STOREKEEPER only. @ | These columns for use of the STOREKEEPER only. Amount |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
| | | | | | | | | | | |

FIG. 11.

_____TELEPHONE COMPANY.

Report of Material used at_____Exchange during_____190__

NOTE—Use Quantity Columns Only.

| Materials | REPAIRS (MAINTENANCE) | | | | | | | | | NEW WORK. (CONSTRUCTION) | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Repairs on Switch Board of Central Office Equipment | | | Repairs on Subscribers' Lines and Equipment | | | Repairs on Toll Lines | | | For New Subscribers' Lines Aerial (Outside) | | | For New Subscribers' Lines Equipment (Inside) | | | Bells, Extension Bells, Generators and Desk Sets Replaced | | | Switch Board and Central Office Apparatus (New Work) | | | This Column Must Agree with Amount of Material Used on Inventory |
| | Quantity | @ | Amount | Quantity | @ | Amount | Quantity | @ | Amount | Quantity | @ | Amount | Quantity | @ | Amount | Quantity | @ | Amount | Quantity | @ | Amount | |
| | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |

FIG. 12.

name of the exchange at the top of the page, and the material shipped, on the debit side. Have exchanges follow each other alphabetically.

If material is shipped on a special estimate, enter the estimate, and number, at the top of the page.

For material shipped to toll stations, enter under a general heading—"Toll Station Account." Other special accounts may be treated in the same manner.

All goods transferred or returned should be entered on the credit side of the ledger. See Fig. 10 for form for "Material Returned or Transferred."

A duplicate copy of this slip should be placed in *each* package, and original slip mailed to the storekeeper, so that lost shipments can be traced. The storekeeper, upon receipt of goods, should acknowledge same by endorsing the duplicate and returning it to the shipper.

The last column of this blank is used by the storekeeper to take credit for the difference between the amount the material was charged out at and the amount credited, should there be any loss, so as to keep his accounts straight.

*Exchange Manager's Monthly Inventories of Materials Received and on Hand*—Have managers send in requisitions

Manager must return this Memo. at once to Storekeeper. Num.

_____TELEPHONE CO.

Shipped to_____ Date_____190____

Via_____

This package contains as follows:

| | Filled by | Checked by | Quantity | Material | Remarks |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

Packages_____ Received in good condition_____

Date_____ Freight or Express paid_____

Exchange Manager.

FIG. 8.

for material to the general superintendent, for his approval, and then send to the storekeeper to be filled. Upon receipt of goods the manager should enter same in a blank book provided for this purpose, for record. At the end of the month a "monthly inventory" should be sent in to the storekeeper, showing balance on hand the first of the month, material received, used or shipped, and balance on hand at the end of the month. See Figures 11 and 12 for blank forms to be used for making out these reports—length of blanks optional.

Figure 12, the "Material Used Report," shows whether the material was used for *repairs* or *new work*.

After these reports have been balanced up by the storekeeper he should credit the different exchanges and accounts, with the materials used, in the exchange ledger; then draw down a balance on stock on hand, which should agree with the managers' reports.

From the exchange ledger, the storekeeper can make up

_____TELEPHONE CO. Date_____190____ Number

Material Returned or Transferred Rec'd at Sup. Dept.____

Credit Entry_____

From _____Exchange. Credit to_____Acct. Ledger

Via—To_____ Do not use these columns

| | Quantity | Material | Price | Amount | This Column for Storekeeper's Use |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

_____Manager.

A duplicate of this notice must be placed in each package, upon which the storekeeper will acknowledge to you the receipt of the goods.

FIG. 10.

his monthly report of materials used, for the general office, showing the totals to be charged up for "repairs" and "new work" to the different exchanges and other accounts. The storekeeper's stock on hand will be the amount of stock carried in his stock ledger and exchange ledger.

For the purpose of checking errors with managers, a form of "discrepancy blank" should be provided, such as shown in Figure 13.

---

Gradually the mines of this and other countries are being equipped with telephones above and below ground, says the *Mining World*. It is a curious fact that to date but very little attention has been paid by telephone manufacturers to making telephones suitable for use underground, probably due to the fact that but until recently was any attempt made to place telephones in the underground workings of mines. However, there are a number of mines already equipped, but these are with telephones made after their own suggestions, the one great feature being a dry box. But two telephone companies in the United States are known to make a strictly mine telephone, and it is probable that these companies will by their own progressive ideas secure a permanent hold upon this coming extensive and profitable additional demand for telephones.

Number_____ _____'00____

To_____Mgr.

_____TELEPHONE CO.

Dear Sir: In checking over your_____Inventory of Material on hand and received (Figure) and report of Material Used (Figure), we find the following discrepancies:

| ARTICLES | YOU REPORT | | | | | SHOULD BE | | | | | Connections | Dis-Connections | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | From Storekeeper | From Subscribers | Returned | Used | On Hand | From Storekeeper | From Subscribers | Returned | Used | On Hand | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

FIG. 13.

# WELL KNOWN HEADS OF WELL KNOWN HOUSES.

T. W. Warner, general manager of the Warner Electric Company, Muncie, Ind., has devoted much time and energy to developing and standardizing apparatus for furthering the cause of Independent telephony. He was born in Shelbyville, Tenn., twenty-nine years ago, and at an early age entered the electrical field, devoting the greater part of his time to electric lighting until 1894. Soon after that date he constructed an Independent telephone system in Northwestern Montana, connecting some valuable mines with the

T. W. WARNER.

outside world and building a toll line seventeen miles long, with over 5,000 feet elevation in this distance, and cutting the right of way through the forest.

Mr. Warner saw the necessity of a self-contained and reliable means for calling subscribers, or rather a practical and economical battery power generator, and spent considerable money and exercised a great deal of energy in producing apparatus to give the desired results. The Warner Electric Company was organized February, 1898, and after much experimenting with induction, automatic and in all some fifteen kinds of devices, none were found to be practical until finally a machine, called the Warner pole changer, was decided on.

Mr. Warner is prominently identified with the Independent movement, being a stockholder in Independent exchanges at Muncie, Anderson, Elwood and Alexandria, Ind. He is a man of practical, original ideas, and through his extensive and varied experience in the telephone field has made many friends.

## FEDERAL TELEPHONE REFINANCING.

Considerable progress has been made with the settlement of the Federal Telephone affairs. It is likely that most of the pool receipt holders will take advantage of the proposition to acquire Cuyahoga and United States Telephone preferred stock. This proposition is considered a very fair settlement of the pool receipt indebtedness and will undoubtedly result in great profit in the long run to those who take advantage of it.

A number of the holders of Cuyahoga common have subscribed for the new Cuyahoga preferred and the floating of the entire issue, or as much as is necessary is assured. Most of the small creditors have been settled with on a basis of fifty cents on the dollar. There were 200 small creditors whose claims aggregated about $16,000.

Most of the large creditors have signified their willingness to grant the five-year extension and accept the collateral trust bond as security. A great many of the large secured creditors have been already settled with on a basis of par for their claims and taking bonds of Federal Telephone subsidiary companies at 90.

The attention of President Dickson and other Federal Telephone officials will now be centered towards issuing the collateral trust bonds and finally financing the entire indebtedness. While everything looks rosy for the financing of the indebtedness and for the securing of money to develop the parent company, the value of Federal Telephone common stock is still a very uncertain matter and it will doubtless be three or four years before anybody can figure out any intrinsic value for the stock. It is purely speculative in view of the great indebtedness of the Federal Telephone Company, and even though that indebtedness be financed it will take several years before it will be known whether Federal will ever be able to pay a dividend. The extension of debts for five years doesn't pay them. It simply gives the companies the opportunity to show whether they are able to earn sufficient money to take care of themselves, pay their fixed charges, pay the Federal Telephone fixed charges and pay dividends on Federal stock. The officials of the Federal Telephone Company are confident that they will be able to do all this, but whether they will or not is a matter for the future to determine. A great deal depends on the success of the Cuyahoga proposition after the new switchboard has been put in and the success of President Dickson in disposing of the Federal Telephone equity in the People's Telephone Company at Detroit. There the Federal Telephone Company has invested the sum of $400,000 in cash and it looks as though the Federal would be a considerable loser at that point, although it is stated that much of this equity is in valuable material which can be used to advantage, and in real estate; but at the same time a very large portion of the equity has been invested in labor and conduits and poles which must ever remain a dead loss unless they are disposed of to somebody in the electrical business who will build a telephone plant at Detroit.—*Finance.*

---

Daniel Drawbaugh, the aged inventor, is about completing a wireless telephone. He is now able to converse a distance of one mile, and after the completion of a new armature, of which he is the inventor, he says he will be able to talk five miles.

Mr. Drawbaugh is 76 years old, and says he is anxious to show to the world a complete wireless telegraph and telephone system before he dies. His work is being closely watched by Dr. Ward of the University of Pennsylvania, who represents the United States Signal Corps and who has been with Mr. Drawbaugh since last August. Dr. Ward will not explain his presence, but it is understood that he is with the inventor in the interest of the United States government.

# QUESTIONS AND ANSWERS ?!?!

CONDUCTED BY J.C.KELSEY, PROFESSOR OF TELEPHONY, PURDUE UNIVERSITY

While testing out a keyboard cable for a new section of switchboard, it was noticed that the ends of the wires of an ordinary two-cell buzzer test set would give quite a severe shock to a person holding them, when they were touched to the winding of a ten-ohm supervisory relay. In Fig. 1, the ten-ohm relay between the terminals 1 and 2 is iron clad, and the buzzer between 3 and 4 just an ordinary buzzer. By taking hold of the circuit with two pairs of pliers at either points, 1 and 2 or 3 and 4, the average person cannot retain hold on them. The voltage of the current is high enough to make it unpleasant for three or four persons, when taking it in series.

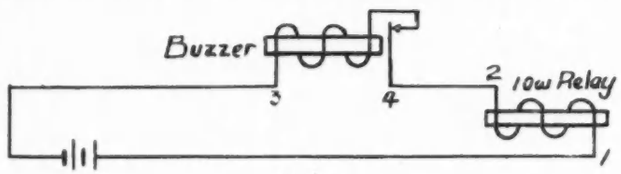


FIG. 1.

The voltage of the cells is only 1.5 each, or three volts for the two-cell battery. What I am curious to know is what kind of a current it is. It comes in slow jerks, perhaps four or five hundred per minute. The jerk comes either at the instant the buzzer makes or at the moment it breaks contract. Is it induced current or is it static current, or is it a sort of a kick?—O. J. D.

This is a case coming under the head of self-induction. If a receiver is placed at the points 1 and 2, and 3 and 4, in parallel with the body, it will be observed that the make of the contact of the buzzer will cause a milder click in the receiver than will the break of the contacts. This will prove that a greater shock is felt at the break. This is observed among employes engaged in installing common battery plants, if time enough elapses, so that the two effects may be separated. This same effect may be noticed in common-battery systems in which some give the subscriber a violent click in the ear, and one lighter one following an instant later, caused by the make and break or the opening and closing of the subscriber's circuit in the act of cutting off the line signal.

The current is induced, or, rather, is the current due to self-induction. It is an alternating current, as would the current in the secondary of an induction coil be when pulsating or undulating current is generated in the primary. There is a great deal of parallelism between the action of the Leyden jar and the winding of a coil with an iron core. Both store up energy. But the Leyden jar will retain the charge, while the coil cannot, as will be seen from a few definitions connected with the phenomenon of self-induction.

One author has said that self-induction is the inherent quality of electric currents which tends to impede the introduction, variation or extinction of an electric current in an electric circuit. When an electric circuit is opened, a spark is seen. It is this extra current trying to uphold the flow. The electrical pressure, for instance, at 1 and 2, 3 and 4, due at any instant to self-induction, is evidently proportional "to the rate of change of magnetization set up by the current in the circuit."

When the buzzer contact closes, the current from the battery passes through the coil of the ten-ohm relay, and magnetizes the core of the coil. The current cannot rise to its highest value immediately on account of self-induction, which causes the current some delay in growing to its full value. This effects the rate of exchange of magnetization, making it slow, and consequently the pressure at 1 and 2, 3 and 4 will not be high, as it depends on the rate of change.

Now suppose the circuit broken. The charging current is cut off, leaving the coil fully charged, waiting for an opportunity to discharge, which it finds in the suddenly placed high resistance caused by the open place. This is infinite resistance. The opening, or high resistance, has no iron core, nor does it delay the current in going to zero value at once. Current is equal to the pressure divided by the resistance, and if we should suddenly put a great amount of resistance in the circuit, the current would change very quickly to zero, if there was nothing in the circuit to impede it. The fact that the opening has no self-inductive power will prove that the current drops to zero in such a rapid manner as to cause the greatest rate of change of magnetizing power. The current is the magnetizing power, hence we get the greatest electrical pressure at the points 1 and 2, 3 and 4, when the break is made. The current can fall to zero so rapidly that the great rate of change of magnetization will often run the pressure up many times the value of the impressed voltage. This will account for the power of two dry-cells to make it unpleasant for even three or four persons to hold on to the terminals.

This self-induction fact is a valuable thing in telephone work, even outside of some of the great principles. The system using the repeating coil and one using relays for impedances, three point systems, take advantage of self-induction in regard to the busy test. The operator's set is bridged in the usual manner, with a condenser in series. Touching the tip of the plug either answering or calling to a busy jack will cause battery to flow back to ground through one-quarter of the repeating coil, or one winding of the impedance coil. This charges the core of the coil, which, when the plug is pulled away from the jack, the current value drops to zero, causing the rapid rate of change, and the consequent click in the receiver of the operator.

---

Kindly advise me at your earliest convenience what voltage and candle power lamp will operate with a twenty-four volt battery, with a 200-ohm coil in series with the same.—R. R. J.

While this could be better answered by a lamp manufacturer, we will try to answer, and see the lamp man before any more questions are handed in. In the repeating coil system there is a twelve volt lamp, used in series with 120 ohms. As the system uses twenty-four volts on an average, it is plain that the hot resistance of the lamp must be 120 ohms, in order to receive its half of the pressure and current. The sixteen-candle-power lamp consumes 55 watts, and the twelve-volt lamp takes one-tenth of an ampere. Then the twelve-volt lamp consumes twelve times one-tenth, or twelve-tenths watts. If the sixteen-candle-power lamp consumes 55 watts, it is plain that the candle power of the twelve-volt lamp should be somewhere near the proportion, which is, 55 is to 1.2 as 16 is to X, or X is equal to nearly one-third candle power. One-third candle power seems to be standard light for switchboard service. Supposing that a lamp had to be put in series with 200 ohms, and be presumed to take twelve volts. Then the resistance of the lamp would be 200 ohms. The current flowing through such a circuit would be about one-sixteenth of an ampere. The watts con-

sumed would be twelve times one-sixteenth, or three-fourths of a watt. According to proportion, the three-fourths of a watt would give a little less than one-fifth candle power, which would hardly be bright enough for best service. The four-volt lamp has a resistance (hot) of twenty ohms and takes one-fifth of an ampere current. Then four-fifths watts would give about one-fouth candle. Another system has a six-volt lamp in series with about forty ohms, with the battery of twenty volts. For a six-volt lamp to get its proper share of the current, it would have to have a hot resistance of about seventeen ohms in series with the forty ohms. The current flowing would be a little more than one-third of an ampere. Then this lamp would consume two watts, which proportionately would give a candle power of six-tenths of a candle. This would be a bright light. This reasoning, however, is not based on lamp factory experience.

We are constructing an extensive and first-class rural telephone system, in which one or more 1,600-ohm bridging party lines are to run into several country stores or residences, where there are switching stations. Kindly advise us concerning the best equipment to secure good day and night service at least expense and annoyance. If practicable, the bells at the switching stations are to ring only when the operator is wanted. We have considered baby knife, simple plug, common-lever and extension-bell switches, plugs, jacks and drops, combined ringers and drops, three-way jacks, cut-in stations, telephone changers, extension ringers and circuit closers, bridging drops and relay attachments, etc., and we do not know what is best for us. Would a generator for each wall set, furnishing a current in either direction to signal the switchboard, and an alternating current for the other sub-stations be advisable? Are subscribers' sets made that way. What are the advantages and disadvantages and uses of the apparatus mentioned? Are any "busy" indicators or selective lockout devices to be recommended?—H. G. N.

Telephone sets may be secured with generators so arranged that alternating and pulsating current may be obtained. To what advantage that would attain would be doubtful unless you wished to ring down the drop at an operator's station without ringing the other bells on the line, by using the pulsating current. None of these conditions seems to be present. All have bells, and the idea is to ring the operator's switching station only when she is wanted. This could be arranged with the addition of a push button on the telephone, which would make the generator ring full

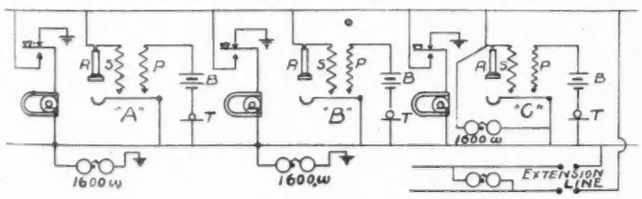


FIG. 2.

metallic when pressing the button, and ringing on one side of the line when the switching station is wanted. All the regular subscribers could be arranged with the 1,600-ohm bells connected from one side of the line to ground. The bell at the switching station would be bridged. In fig. 2 there are two subscribers' instruments across the line at A and B, and the switching operator's instrument at C. The bells of A and B are connected to ground, while at C it is bridged. The push button is so arranged that normally it will ring on one side of the line. A and B can ring now and C will not be disturbed. If A wants C he presses button and rings C's bridged bell without affecting B. Likewise can B ring C, without affecting A. When extension line is wanted, the operator at C can simply throw a baby knife switch, and let A and B do their own ringing on the extension, but in this case, if the extension wanted A or B, then C would have to do the ringing, unless the generators were arranged as at A, B and C. This method would be available if the lines were short or not sensitive—that is, paralleled by electric circuits—but such a method is likely to unbalance the line. All this has been based on the assumption that the service is metallic. If the service is grounded, then such treatment as outlined will not be available. If grounded service is given, then no ordinary selective methods will do any good. There does not seem to be a general use of the selective lockout system, yet there is no reason why it cannot be used. It is to be suspected that such apparatus is too delicate for general service. For the extension line, the ordinary double pole switch will suffice. A 1,600-ohm extension bell is permanently bridged on the extension line, so that calls may come in over the line. The set C is permanently bridged on the main line in the diagram, and it is advisable to have another double pole switch, so that C may be cut off from the main line and connected to the extension line, enabling C to talk at times without prohibiting A and B to use the line at the same time.

## MUSIC FOR TELEPHONE USERS.

At last the telephone girls have discovered a way to pacify impatient patrons who are "holding the wire," says the Chicago Inter Ocean. Recently a north side resident called up the police department.

"They're busy," answered the hello girl, cheerfully.

"But this is important, and I must get them," urged the citizen.

"Well, hold the wire, and I'll put them on as soon as they are through," was the answer.

For a few minutes there was silence on the line. The citizen was getting ready to protest against having been forgotten. The telephone operator realized the state of affairs from long experience with similar cases.

Suddenly the strains of "I've Waited Years for You, Darling," came singing in across the wire from a full orchestra. The subscriber pricked up his ears. It was a full orchestra he had tapped and "Under the Bamboo Tree" and "Hiawatha" came trooping along over the wire in swift succession.

Then a sweet voice broke in. "How do you like that? The first was Kinsley's, the second Rector's and the third Vogelsang's. Your party's here now."

The citizen managed to get in a word of thanks before he was given his connection, and for the first time in a week retired from the telephone in an amiable state of mind.

## WHEELING AND LAKE ERIE TELEPHONE SYSTEM NOW IN WORKING ORDER.

The telephone system along the Wheeling, W. Va., & Lake Erie Railroad, which has been under course of construction for some time, is now practically completed. The telephone men have finished the work at Terminal Junction near Martin's Ferry, which is the terminal of the Wheeling & Lake Erie proper. This telephone system promises to become one of the necessities of operating systems generally in the future. As the telephone has been in use on the line as far as it has ben completed for several weeks past, the scheme has proven itself to be of great value, as it relieves the telegraph wires of a great amount of work that can be handled with more satisfaction over the telephone. The most important feature of the railroad telephone is the service it renders in case of an accident to a train while out on the road between stations. All cabooses are equipped with a telephone box and a rod that connects it with the wires. The train can stop at any point and call the dispatcher or any office along the line. In case of accident no time is lost in notifying the proper officials and getting the wreck crew on the scene. The establishment of the system did not require the putting up of another line, but the telegraph wires are used without interfering with the sending of telegraphic messages—verbal and tick messages going at the same time.

# DECISIONS AFFECTING TELEPHONY

BY G.W. HAND

POWERS OF AN ACTING PRESIDENT.

In August of 1901 the Spokane and British Columbia company brought suit against the Inland company for $205,000 damages, which they claimed were sustained by the breach of contract. This suit was discontinued and a settlement negotiated out of court. W. H. Fernald, a creditor of the Spokane company, had loaned the company $15,000, secured by a mortgage on the telephone equipment. The settlement of the original damage suit as was alleged by Fernald was "in fraud of his rights as mortgagee," he claiming that the settlement destroyed his security. Fernald thereupon petitioned that a receiver be appointed to take charge of the business. The company appeared by its attorneys and agreed to submit evidence from which the court was to decide the case on its merits. At this hearing a receiver was appointed. The president was absent from the country at the time of the request for the petition, and the vice-president, one Babcock, authorized the proceedings which resulted in the appointment of the receiver. Later other parties claimed that this officer had no right to authorize the act and therefore the company was not bound by the first appointment, and attorneys made an order that the original be vacated. The controversy turned on the question whether the vice-president and acting president had gone beyond his authority in the premises. Upon the second hearing a new receiver was appointed, but the court refused to take the business out of a receiver's hands. Appeal was then taken to the supreme court. No effort was made to set aside the appointment on the ground that Babcock had not a president's authority, the sole ground of objection to sanctioning his procedure being that he could not authorize such proceedings without the express authority of the corporation. The court was of the opinion that Babcock had the right to authorize the attorneys to appear in the original receivership suit, and, quoting from an authority on the subject, said, "If the president exceeded his authority in retaining counsel, the corporation must look to him for any damages sustained in consequence of such unauthorized act." In this court the effort to set aside the appointment failed a second time.

*Fernald v. Spokane and British Columbia Telephone and Telegraph Company, et al.* 72 *Pac. Rep.* 462.

RESPONSIBILITY IN PERSONAL INJURY CASES.

It seldom occurs in a claim for personal injuries that the wronged party makes claim for damages against more than one defendant, but a case recently tried in the circuit court for Daviess county, Kentucky, furnishes an apt illustration of such a state of facts. The city of Owensboro had employed Westinghouse, Church, Kerr & Co. under contract to construct an electric light plant in the city. The construction had gone on to completion. The Cumberland Telephone and Telegraph Company was engaged in erecting a telephone line from its exchange building to the messenger office along Ann street, which runs at right angles to the line of the electric light wires which cross the street in the ordinary way. The work of constructing the telephone line was in charge of Rufus Lee. The crossing of the electric light line was to be made by elevating the telephone wire over the electric light wires. South of the electric light wires were two poles. Thomas Ware, an employe serving under Lee's instructions, took the telephone wire up the first pole and threw it over the cross arm. The same thing was done by a second workman at the second pole, whereupon Lee took hold of a rope which was attached to the telephone wire and threw it over the electric light wires and then caught it up again on the other side and by pulling drew the telephone wire over the electric light wires. The telephone wire became charged from the electric light wires and Ware was instantly killed.

Action was brought against the city, the construction company and the telephone and telegraph company, jointly, to recover damages. The claim against the city and construction company was that these two parties had been negligent in not properly insulating the electric light wires. The telephone and telegraph company was joined on the allegation that one of its officers had been negligent in pulling the telephone wire over the electric light wires, which it ought to have known were not at the time properly insulated, or in the alternative that if the electric light wires were properly insulated the telephone and telegraph company was negligent in drawing the telephone wire over the electric light wire in such a manner.

Recovery was sought jointly against the three parties, imputing negligence to each one. The verdict, however, exonerated the city of Owensboro and the construction company and found the "proximate cause" of Thomas Ware's death to be the telephone and telegraph company's act in bringing the telephone wire in contact with the electric light wires.

Appeal was taken to the court of appeals of Kentucky, but in the higher court the decision of the lower court was sustained.

*Cumberland Telephone and Telegraph Company v. Ware's Adm'x.* 74 *S. W. Rep.* 289.

RIGHTS IN HIGHWAYS IN NEW YORK.

In an ejectment suit recently brought by Barbara Myers of Wheatfield, New York, against the Bell Telephone Company in which the Bell company won in the Niagara county court, the supreme court, appellate division, fourth department, decided against the telephone company and ordered a new trial. Plaintiff owned a farm over which passed a railroad and highway in which the public had an easement for purposes of travel. The telephone company had set eight telephone poles along this highway and suit was brought to oust the company. The question turned on the ownership of the fee in the highway, which the court decided was in the plaintiff, reversed the decision of the lower court and ordered a new trial.

*Myers v. Bell Telephone Company of Buffalo,* 82 *N. Y.* 83.

MEASURE OF DAMAGES IN TEXAS.

The case of the Southwestern Railway Company of Texas v. Hughes, although not one in which a telephone company was directly interested as plaintiff or defendant, nevertheless illustrates very well the law in that state on the measure of damages to which property owners are entitled for damages to which their property has been subjected by the presence of public uses crossing such property or being adjacent

thereto. Reference is here had, not to the value of the land appropriated, but more particularly to the damage to the adjoining property occasioned by the taking of the property and converting it to the public use. The railway company wished to run a new line over two tracts of land belonging to W. E. Hughes near Dallas, Texas. Condemnation proceedings were begun in the Dallas county court and afterward the case was taken to the court of civic appeals, where it was reviewed.

The court disposed of the question of the measure of damages of the land actually taken by saying that the measure of such damages is the market value of the land in the shape it was in when the land was taken. As regards the damages to the remaining portion of the land, the court said, "The measure of damages is the diminution of the value of the property resulting from the construction and operation of the railroad, to be determined by ascertaining the difference between the market value of the property just before the construction of the railroad and its value after such construction." The statement of the law would undoubtedly be the rule that would be followed by the Texas courts in all such condemnation proceedings and would equally be applicable to telephone companies, were the same question to arise.

*St. Louis Southwestern Railway Company of Texas v. Hughes.* 73 *S. W. Rep.* 976.

RIGHT OF EMINENT DOMAIN IN ARKANSAS.

The law in the state of Arkansas on the subject of telephone companies obtaining rights of way over railroad property and the procedure thereunder to obtain these rights of way is very well considered in the case of the St. Louis and San Francisco Railroad Company v. Southwestern Telephone and Telegraph Company recently heard by the circuit court of appeals for the eighth judicial circuit. Late in March of 1902 the telephone company filed a petition in the circuit court for Sebastian county to obtain from the railroad corporation the right of way on the railroad to erect its wires and poles between Fort Smith and Huntington, a distance of about thirty-two miles. April 11 following the county judge made an order giving the telephone company the right on condition that a deposit of $1,500 be made. Finally the case was removed to the United States circuit court. In the early part of the following July the railroad company filed a bill asking that the telephone company be enjoined from building its proposed line. The bill was dismissed. Appeal was taken to the circuit court of appeals, where the law on the subject was thoroughly discussed.

The telephone company relied on a statute of the state which reads as follows: "Any railroad, telegraph or telephone company organized under the laws of this state, after having surveyed and located its lines of railroad, telegraph or telephone, shall in all cases where such companies fail to obtain by agreement with the owner of the property through which such lines pass, the right of way over the same, apply to the circuit court of the county." In this court, in the case of the telephone lines, the right to erect the proposed line over the railroad right of way is given. The railroad company set up several defenses to the operation of statute in this case, among the principal ones being that the telephone company had not made any survey of the particular position that it intended to occupy on the railroad. On this point the court held that the statement by the telephone company in its first petition that it wished to erect its line "on the opposite side from that of the Western Union telegraph line, forty feet from the center line between the rails," etc., was of sufficient exactness to avoid the necessity of a definite survey.

The most important question in the opinion of the court that the case presented was whether there was a necessity for the taking by the telephone company of the "easement" which it sought. This question, however, the court said was foreclosed by the fact that the state of Arkansas had expressly empowered telephone companies to construct and operate telegraph and telephone lines along the railroads within the state provided the latter are not thereby obstructed, and just damages are paid to their owners.

Through the whole argument the court held that the telephone company had the right to erect its proposed line, and generally overruled the objections of the railroad corporation; but inasmuch as the proposed line was to run through the Indian Territory and the telephone company was not incorporated therein, the court held that the right of eminent domain which it could exercise under the statutes of Arkansas could not be exercised in the Indian Territory without proper condemnation proceedings in the Indian Territory. The case was referred to the circuit court from which this appeal was taken, with instructions that the telephone company take proper proceedings in the Indian Territory, which the telephone company has no doubt done at this writing. The decision, while temporarily delaying the proposed line, was a plain victory for the telephone company.

*St. Louis and San Francisco Railroad Company v. Southwestern Telegraph and Telephone Company.* 121 *Fed. Rep.* 276.

## THE OLD AND THE NEW.

The reprieve of a criminal by telephone at Sing Sing prison the other day just as he was about to be electrocuted has suggested the difference between that sort of thing today and as it existed in the times made famous in the Waverly Novels.

Fitz-William bends his haughty neck above the dripping block,
Prepared to feel it cleft in twain in one sharp, sudden shock,
When suddenly comes thundering across the echoing moat
A cavalier with cries of "stay!" exuding from his throat;
With saber flashing through the air he meets the gleaming ax,
When of its pallid, prostrate prey but half an inch it lacks,
"What ho!" observes the cavalier, triumphantly, "I bring
Good news for him reposing there, a pardon from the King!"

Bill Baily sits uneasily within the fatal chair,
A third-rail clamped against his feet, another on his hair;
The purring dynamo sings soft, and sizzling sparks illume
The dim and clammy atmosphere that fills the fearful room;
But just a half a second ere the button can be pressed,
And William, willy-nilly, can proceed to do the rest,
The telephone bell tinkles, and a voice exclaims: "Hello!
Bill Baiy's been commuted, so shut down that dynamo!"

Oh! poetry, dust-trampled; oh! crushed and dead romance.
In these progressive, modern times you never get a chance.
For what could Walter Scott have done, had he been forced to write,
"The King took down the telephone and said, 'Don't kill that knight?'"
Electric light shines not through dreams, and on the telephone
We can't call up the visions that our boyhood days have known.
The gleaming spear, the flashing blade, the waving plume, at last
Go nodding down the corridors that lead but to the past.

—James Montague in the Chicago American.

Of the more than two hundred replies received by Dr. George M. Chappell, United States weather observer, from the telephone managers of Iowa, on his proposition to establish a system of having the daily weather forecast sent to all telephone customers, especially on the rural lines, only three replies were unfavorable. All the others expressed perfect willingness to co-operate with the department in circulating the weather forecasts. The farmers are becoming deeply interested in the plan and are asking that they be given the service.

The telephone and the telegraph are already beginning to be extensively employed in Abyssinia. The cities of Narsar and Jibutil will soon communicate by telephone, and the line constructed by Italian engineers to connect Asmasa and Tigse with Massaouah is said to be in constant use. Severe penalties, such as the cutting off of hands, have been provived for all natives who shall disturb the wires.—*Elektrotechnische Zeitschrift.*—Translated for TELEPHONY.

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### A PLAIN DUTY.

It is the duty of President Dougherty and his officers and executive committee, as well as the duty of the officers and executive committee of the Inter-State Independent Telephone Association, to call their respective officers and committees together in the city of Chicago within sixty days, where, with the co-operation and assistance of the manufacturing interests and telephone press, a mighty *National Independent Telephone Association* can be formed to take over both associations. Mr. Dougherty assured the editor of TELEPHONY that he would use every reasonable means to bring about such a consummation, and in accepting the presidency of the Independent Telephone Association of the United States of America it was with the understanding that assistance would be given him in this direction. Mr. Jones, the new secretary, has also pledged his untiring efforts to bring about a greater national association and to use every endeavor to harmonize all differences. At a meeting of the executive committee of the Inter-State Independent Telephone Association held at the Sherman House, Chicago, June 25, the general feeling among the committee was to the effect that an amalgamation of the several associations was a necessity. This publication has held and still holds that this is the only solution to the association problem. Let every man work to this one end and let there be no dissenting voice in the organization of an association to broadly cover the whole United States and all branches of the Independent art.

### THE NEED OF ACCURATE DATA.

Statistics gathered and carefully compiled with due regard for accuracy rather than for magnitude in numbers indicate that there are in the United States more than three thousand companies, organizations, firms or individuals engaged in the business of operating more than six thousand Independent telephone exchanges and more than five hundred separate toll lines. Though many of these exchanges have a subscriber capacity of less than one hundred lines, in others from four hundred lines up to a thousand lines are being operated in towns where the Bell had previously operated less than one-fourth that number. In other words, the Independents are engaged in a magnificent educational undertaking in developing the use of telephones as it never could have been promoted under the old conditions, and the public is the beneficiary.

It is reasonable to believe that in all probability not a single exchange nor a single toll line would possess the legitimate right to supply telephone service with Independent transmitters had the leaders of the National Association failed to have vigorously fought the Berliner suit. Yet, unpleasant as it may sound and ungrateful as it certainly was on the part of many Independents, the records show that only a small percentage of all these separate Independent companies, organizations or individuals joined the National Assocaition or aided its work in any manner or contributed one penny to the Berliner trust fund.

There are strong hopes of a greater national association being organized and having a permanent headquarters in Chicago; an association in which destructive dissensions and partisan strife will find no welcome; an association whose members will have the moral courage to conduct its affairs on business principles and succeed in amalgamating the present National and Inter-State associations.

From the viewpoint of equity and fair play every one of these six thousand exchanges and five hundred toll lines that are strictly Independent and not using Bell transmitters should be enrolled on the membership list of this proposed greater national association and their respective owners should rejoice in the opportunity this afforded to practically prove their gratitude for past priceless favors which the ma-

jority of Independents accepted without the courtesy of even a simple acknowledgment. If earnest efforts are put forth along this line, membership in this proposed new association would soon be a coveted honor that many would strive to gain.

There may be strength in numbers. There is far greater strength in grateful numbers, but mightier far than all else is the power of achieving the seemingly impossible inherent in great, grateful, intelligent numbers, intelligently organized, actuated by one lofty aim and one mighty purpose and moving as an irresistible unit.

With all these sources to draw from there is no good reason why the membership of the proposed greater national association should be less than three thousand in number at the close of the first six months with ten thousand dollars in its treasury.

From a broad point of view such a working fund as this can be most effectively expended and should be properly and profitably used in gathering and accurately compiling and publishing that class of statistics that will appeal most quickly to the investing public.

However, before this working fund can be secured or comprehensive statistical work undertaken it will be necessary for the National and Inter-State to merge into one greater, broader body. To be of true value the new association must be harmonious and free from partisan bias.

If this is done beneficial results will soon be felt in many ways, the entire movement will take on a new life and a more wholesome enthusiasm, and the association will command the respect and support of every true Independent.

For obvious reasons the headquarters of the secretary and of the association should be established in Chicago. The secretary would soon be in correspondence with the different operating companies and speedily have under way a systematic and comprehensive compilation of statistics serviceable in every phase of the movement. In the beginning of this work the secretary could readily gain assistance from operating companies, firms and individuals and of recently organized firms or companies not yet operating, which could be used to supplement and check the lists transferred by the old associations.

Having prepared as complete a list as possible of all operating Independent exchanges and toll lines and of new organizations not yet supplying service, intelligent, persistent and systematic effort should be made to induce all who are not members of the association to join without further delay, and these efforts should be repeated until every operating Independent organization, every manager of an exchange or toll line and every ambitious employe is enrolled on the list of members. Once a month a list of those who do join should be prepared and sent to the telephone and electrical publications.

As soon as an ample income is assured the secretary should proceed to classify the operating exchanges by states, and then strive to secure the additional data that will enable investors to quickly perceive the salient facts that capital always looks for. To-day there is no authentic data available to the general investor covering the scope of the entire Independent movement and its success from a financial standpoint. Many statements concerning the magnitude and the scope of the Independent movement as a whole have appeared from time to time; but the statistics included were of so general a character and so limited in analytical value that they have proved to be more harmful than beneficial to the cause they were intended to promote. In a few cases excellent work has been done in the gathering and compiling of statistics showing the progress of the movement in a single state or in two or three states, but the general absence of correct and comprehensive data covering the progress of the movement as a whole has always been a source of sincere regret to those who have the highest interests of the movement at heart and who have ever stood ready to do more than their proportionate share in aiding the association to secure a correct compilation of Independent statistics that would serve to allay the suspicions regarding the stability of the movement, both in its entirety and its component parts, that are due as much to unintelligent procedure as to inimical interests.

Incidentally the questions may arise in the mind of the reader as to what benefits will accrue to the individual members in return for the payment of membership fee and annual dues.

From our point of view numberless are the benefits that the individual will derive by joining this proposed association and heartily co-operating with the secretary in his efforts to supply the financial world with up-to-date and accurate information concerning the character and the scope of the Independent movement. Given a market where Independent securities can command a fair price, the growth and spread of the movement will be limited only by the facilities for supplying equipment and construction material. Every new exchange, every new toll line, every new organization means new openings and greater possibilities for the industrious and ambitious. And added responsibilities and increased pay usually go hand in hand and with rapid growth will come rapid promotion.

Every Independent telephone man should work incessantly toward bringing about a greater national association, that the whole movement may be strengthened and the greatest good be accomplished for the greater number.

## THE INTERSTATE TO MEET IN DECEMBER.

At a meeting of the executive committee of the Inter-State Independent Telephone Association held at the Sherman House, Chicago, on June 25, 1903, it was decided to hold the next annual convention of the association in Chicago on December 8, 9 and 10, 1903. The selection of hotel and other preliminaries of the meeting was left to committee on arrangements. It is to be hoped that before the date set for this meeting there shall be consummated the plan for bringing the different associations together on a basis set forth in this issue of TELEPHONY.

## THE KELLOGG SALE.

The announcement during the past month that a majority of the stock of the Kellogg Switchboard and Supply Company is in the hands of the Bell interests comes as a great surprise and a shock to all who really have the Independent telephone movement at heart. The shock is rendered more painful by the circumstances surrounding the transaction, the sale of the stock having been sedulously concealed from the public, and even from the agents, officers and stockholders of the company, with one exception. We publish elsewhere in this issue a statement of the facts as authorized by the parties interested. We feel that the matter is of great importance to the Independent industry, affecting all alike; the manufacturers because suspicion once aroused ever seeks new directions; the consumer or operating company because many questions of law supervene in relation to patent suits that have been or may be brought, and in the interpretation of contracts regarding extensions and the matching or duplicating of apparatus; the engineers and agents of the Kellogg company (who have built it up) particularly and painfully, because they have not only been kept in ignorance of the fact of the sale, but have received from time to time the most positive and unqualified assurances that the company was not and never would be controlled by the Bell interests, and on the strength of these assurances (from the man who had personally conducted the very deal thus denied), they have honestly and in good faith pledged their individual words to the customers of

the concern, and thereby obtained large contracts which would otherwise never have come to the company.

We have considered it of sufficient importance to our subscribers to have a full and accurate discussion of this matter, to go to some pains in the investigation. The concealment practiced has thrown an air of mystery about the affair affording opportunities for the circulation of rumors that will be generally injurious if uncontradicted. We shall, therefore, briefly discuss the facts, and the suit that has been brought, in the light of our recent investigation.

After a careful study of all the correspondence and records pertaining to the case, we have reached the conclusion that the sale of Mr. Kellogg's stock in the Kellogg company to Mr. Barton was the act of one man and one man only, Mr. Wallace L. DeWolf, who seems to have been entirely misguided, and who certainly proceeded without competent advice. The only excuse he can reasonably set up is his lack of familiarity with the business, and his lack of acquaintance with the men engaged in it. Mr. DeWolf personally is not a factor in the telephone business, however; never has been, and never will be; hence any lengthy discussion of his motives is superfluous.

One thing may be taken as incontrovertibly true: Mr. Kellogg, Mr. Dunbar, Mr. Miller, Mr. Dommerque and others, agents and employes referred to above, had as little knowledge of the transaction as any outsider, and each and every one of them is using his utmost efforts to neutralize the ill effects that would otherwise follow to the trade generally; and they are all a unit in their determination that their friends and customers will be fully protected. The minority stockholders have already filed a bill asking for a resale; have obtained a preliminary injunction, and will doubtless exhaust their resources before they surrender to the enemy.

We have made a careful investigation of the status of this suit, instituted by the minority stockholders of the company. They seek to restrain the American Telephone and Telegraph Company from directing or interfering with the management of the Kellogg company, and to cause the alleged sale of the stock of the Kellogg company to be declared illegal and void, and thus to bring about the re-instatement of Mr. Kellogg in the controlling ownership and management of the company, which he founded. We have carefully read and considered the bill of complaint in the case, and also the answer of the president of the Kellogg company (the other defendants not having as yet filed their answers); also the correspondence which has passed between Mr. Kellogg and his counsel, on the one hand, and Mr. Barton and Mr. Fish, the presidents of the Western Electric Company and the American Telephone and Telegraph Company, on the other hand; and have also read the written opinions of two of the eminent counsel who have been employed to represent the interests of the minority stockholders.

One of the counsel says with reference to the matter:

> I am of the opinion that the purchase of the stock by Mr. Barton in the interest of and for the benefit of the Bell Telephone Company was an invasion of the right of the minority stockholders and that the majority stock so purchased ought not to be allowed to control the elections or policy of the company.

The other eminent counsel says:

> In answer to your inquiry as to the nature and the probability of success of the legal proceedings instituted by the minority stockholders of the Kellogg Switchboard and Supply Company against the American Telephone and Telegraph Company, Western Electric Company and others, I beg to say that the object of the suit, as appears by the bill of complaint, is to prevent such defendants from participating in any way in the management of the Kellogg company and to cause the sale of Mr. Kellogg's stock in the company to be declared illegal on principles of public policy, to be annulled, and Mr. Kellogg reinstated in his old position in the company. Judge Tuley of the circuit court of the state of Illinois, before whom the stockholders' suit is brought, has granted a preliminary injunction which prevents the defendants above from disposing of the stock pending the litigation, or from influencing in any manner the management of the company, or from interfering with the patent suits now pending against the company and its customers.
>
> I have had the matter under advisement for several weeks, and have given it the most careful consideration. My opinion is that the purchase of the stock by the above defendants or either of them under the circumstances should be held to be illegal, and the Bell interest not be allowed to again enter into the management and direction of the company, and that the outcome of the proceedings is likely to be the reinstatement of Mr. Kellogg in his old position in the company.

It is said that the answer which has been made to the bill of the minority stockholders does not deny or dispute what were relied upon as the material points by the attorneys, in forming their conclusions, and which were understood to be considered by the judge as the basis for granting the preliminary injunction. It has been reported since the injunction was granted that the Bell interest intended to move at once to have the injunction against them dissolved. It is now understood that this intention has been changed and that they will not contest the right of the preliminary injunction. It would therefore appear that the case of the minority stockholders is considered by the Bell people to be of very considerable strength.

The answer which Mr. DeWolf (the president of the Kellogg company) as interposed in the suits, sets up that the secrecy in the conduct of the business since the purchase of the stock was for the interest of Mr. Kellogg and not at the desire of or for the purpose of helping the Bell telephone interests. That this assertion is incorrect seems to be borne out by the correspondence which passed between the parties. For instance, Mr. Kellogg, in a letter which he wrote to Mr. Barton on this subject December 26th, 1892, said:

> There was a plan which apparently originated at the time of the purchase and which has been carried out by the management of the company and by yourself since then to conceal the sale and the purchase by you from the public and from the customers of the company; and thereby obtain for the company much valuable business which could not otherwise be obtained. That this plan was a part of the understanding at the time of the sale is shown from a letter which I received in California from Mr. DeWolf the last of May. He said: "It took about $300,000 in cash to save the company from the effects of the Everett-Moore failure. *As to what Clarence Buckingham and I have done with the 992 shares you assigned to me and the balance of your stock left with me, and how we raised this amount, we are under obligations not to say to any one, and I don't want you to ask me.*"
>
> The customers of the last year have every right to expect and to demand that they be placed in substantially the position they expected and were assured they were in with respect to the Kellogg company when they made their contracts. My own name having been used, as it has been, without my knowledge or consent, I have a just right to ask, as I do, that I be placed in the position of ownership which has been assigned to me with the public during the last year, on fair, reasonable and equitable terms.

Mr. Barton, in his answer to this letter of Mr. Kellogg, did not deny or question any of the statements Mr. Kellogg made, but apparently, by implication, assented to their correctness.

It would appear from a perusal of the answer of the president of the Kellogg company that the most serious contention the defense relies upon is that Mr. Kellogg is estopped from obtaining a rescission of the sale of his stock on account of alleged ratification by him of the sale. As a matter of fact, the suit is one brought by the minority stockholders, and not by Mr. Kellogg, to have the sale declared illegal and void *ab initio* on principles of public policy, and if the sale is void, of course it never existed at all, and therefore could not be ratified by subsequent acts on his part. The fact should not be overlooked that the "Illinois Anti-Trust Act" provides that contracts made in restraint of trade are absolutely void.

A perusal of the correspondence, morever, does not seem to show that Mr. Kellogg has ratified the sale by his subsequent acts, especially his efforts to obtain back his stock by peaceable means, rather than by starting into litigation, but, we think, the contrary. Two days after he knew of

the sale, he wrote a letter which he intended to be and which was read to the representative of the Bell interest, in which he said that he would waive for the present the consideration of whether the sale was authorized, but proposed that an effort be made to obtain an amicable arrangement "to have the matter placed in such shape that the customers of the company, both past and future, would be practically, in fact and in appearance, safeguarded against any possible action in favor of their (Bell) competitors," quoting Mr. Kellogg's words. All subsequent negotiations resulted from this letter, and in all these negotiations he apparently never wavered for a moment in trying to obtain some readjustment of the matter, by the return to him of all the stock or otherwise, which would practically safeguard the customers of the company against any possible action of the Bell interest; and he was willing to accept practically any arrangement which would produce that result, as the correspondence abundantly shows. The correspondence also shows that when he had recovered his health sufficiently to take up the negotiations to that end and before the negotiations had really begun, he asked the advice of his counsel as to whether the sale of his stock was legal, under the circumstances, and his counsel advised him that his right to disaffirm the sale would be as good in the future as at that time, and said further: "I would work the present negotiations to an end before considering any other course."

The answer of the president of the company also claims that the sale was ratified by Mr. Kellogg "in a subsequent contract, dated April 22nd, 1903, which was executed by this defendant (Mr. DeWolf) for said Kellogg, with the full and personal consent and approval of said Kellogg." A perusal of this contract of April 22nd, however, shows that it was entered into by such defendant personally, and not as the representative of Mr. Kellogg, and we understand that the contract was drawn up and executed while Mr. Kellogg was absent in the South and that he did not see a draft or a copy of it until after his return. We also understand that such preliminary conversations as were had with Mr. Kellogg concerning the possible or probable modification of the contract occurred while negotiations were pending which had been suggested by the president of the company, and the Bell interest for Mr. Kellogg's return to the company, with the understanding that it should be operated strictly as a manufacturing proposition. When the negotiations reached a certain stage, however, the representatives of the Bell interest refused to enter into any agreement that the company should be thus operated. What Mr. Barton and the attorney of the Bell interest in Chicago (who personally met Mr. Kellogg's attorney) refused, was to accept the written suggestions of Mr. Kellogg's attorney, reading as follows:

> It appears to me that there ought to be an express disclosure of the real party in interest, the beneficial owner in your purchase of the Kellogg company's stock and in the purchase from the St. Louis parties, and that there ought to be as part of the transaction in closing it, a contract to the effect that the policy of the Kellogg company shalll be to conduct a straight manufacturing business for profit to itself and for the benefit of its customers *and that this policy is not to be subordinate to any interest of the Bell company or its allies or customers.*

When Mr. Barton and the attorney of the Bell interest had refused to consider the suggestions above, Mr. Kellogg with his attorney came to the conclusion that he could not safely or properly return to the Kellogg company, under the terms of Mr. Barton's offers and notified the president to that effect.

Mr. Kellogg, having thus exhausted every effort to place the company by peaceable negotiations on some basis by which its customers could be safeguarded against any possible hostile action by the Bell interests and having failed, the suit of the minority stockholders was promptly begun to obtain the same end by legal means.

From the written opinions of the counsel who have been retained in the case, and from our own careful consideration of the case, there seems to be strong ground for belief that this end will be accomplished. We trust it may be so. We must express regret that Mr. DeWolf did not explain his embarrassment to some of the well-known and prominent men in the Independent field. We feel quite sure that we could name a goodly number of our friends who have the means and the breadth of the mind as well as the sincerity of purpose to lend a helping hand in such an emergency as that alleged by Mr. DeWolf, who showed his ignorance of the business in no more striking manner than in supposing (if he did) that the Bell people controlled all the money and financial acumen in the field.

## SHRINKAGE OF FOUR MILLION BELL STOCK.

The gradual decline in Western Telephone common from around 30 to 13, says the Boston "News Bureau," has been one of the marked features on the Boston exchange. The stock has sold as high as 33½. The decline in the preferred has meanwhile been comparatively small, the recent loss in prices being from around 98 to 91.

There is $16,000,000 of each class of stock issued. The outstanding bonds amount to $9,834,000. The preferred stock is entitled to 6 per cent cumulative dividends after two years, the present rate being 4 per cent. There have been no dividends paid on the common.

The net revenue reported for the shares for the fiscal year ending December 31, 1902, was $673,849, or $33,849 more than required to pay the 4 per cent dividends on the preferred. The undivided earnings of the sub-companies were not reported.

The Western Telephone Company succeeded the old Erie Company. The bonds and a portion of the preferred stock were issued to retire the old Erie bonds, while the remainder of the shares were issued in exchange for the $10,000,000 Erie stock, to retire $9,000,000 of floating debt, and to raise $6,000,000 of working capital. The value of the properties acquired was placed by Messrs. Stone & Webster, who made an appraisal at $26,300,000, apart from franchises and rights of way, which have been estimated at $6,000,000 more.

Western Telephone owns about 80 per cent of the stocks of its sub-companies. None of the latter have bonds, except the Postal Telegraph Company of Texas, which has $1,189,000, and the Michigan, which has $5,594,000, including the Detroit Company. The Michigan also has a floating debt of $2,400,000. Deducting total bonds and floating debt of these sub-companies, $9,200,000, from the estimated value of the properties, $32,300,000, leaves $23,100,000. About 80 per cent of this or $18,500,000, represents the value of the equity of Western Telephone in the old Erie properties. The parent company has also a working capital of $5,500,000.

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Captain Tom Frye of Highland, Cal., has a bull terrier named "Ted," who, among other accomplishments, understands the uses of the telephone. Recently the captain was driving with some friends and Ted was accompanying them. The party called on the captain's father, and when they departed the dog was left behind. The captain missed his canine friend, but expected to find him at home upon his return. Such was not the case, however. He called up his father's house and asked if Ted was there. "Yes," came the answer. "Send him home," said the captain. "We've been trying to send him home all day, but he will not go a step." "Put him up to the telephone," said his master. This was done, and the captain shouted, "You, Ted, you come home, sir!" Ted made a break for the door, and when it was opened shot into the darkness. In less than ten minutes he appeared at home, some two miles distant.

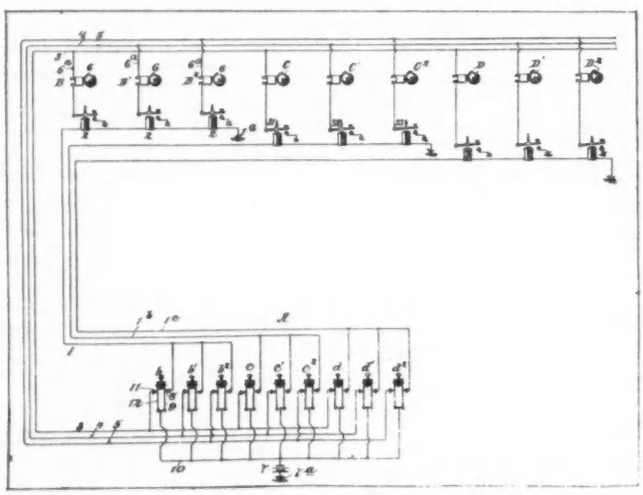
# DIGEST OF TELEPHONE AND KINDRED PATENTS

Information concerning any patent will be furnished without charge by addressing Edward E. Clement, Editor of this Department, McGill Building, Washington, D. C.

MAY 12, 1903.

727,702—C. B. Smith, electrical signaling or calling system.

Some of Mr. Smith's work has recently been described in these pages. The present invention is one development of his general idea of serving many stations with few line wires. It is a system of signaling or "calling up," there being nine stations shown, with means to call them from a central office. In the diagram *B, B', B2, C, C', C2,* and *D, D', D2* are sub-stations having bells or ringers each included in a ground branch *6a* normally open at the contacts of a relay *2*. Two groups of wires lead from the central office to all the sub-stations, the wires of the first group, *1, 1b* and *1c*, being connected through the relays, three relays to each wire in series, and the second group of wires, *3, 4* and *5*, being connected to the ringers in the following manner: Wire *3* is connected to station *B, C* and *D* in parallel; wire *4* is similarly connected to *B', C'* and *D'*, and wire *5* to *D2, B2* and *C2*. At the central office a grounded battery *7* is provided, connected in parallel to all the series of keys



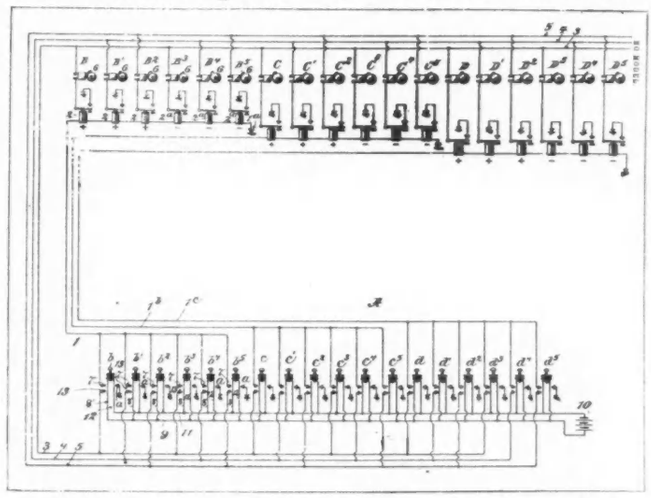
727,702—ELECTRICAL SIGNALING OR CALLING SYSTEM.

*b, c, d,* etc., each key having a pair of springs connected to the battery and a corresponding pair of contacts, *8* and *11*, connected respectively to two wires, one of each group. Each key represents a different combination and will therefore ring its own bell only. In operation, suppose station *B* is to be called. Key *d* is depressed and current goes over wire *1* to all the relays *2*, pulling down their armatures at sub-stations *B, B', B2*. Current also goes over line wire *3* to the bells *B, C* and *D*. but as *B* is the only one whose circuit is closed at its relay, it alone responds. Each other station is worked by its corresponding key in a similar manner.

In a mathematical sense this is location or selection by two dimensions. It would be possible to get a greater number of stations on a smaller number of wires if each wire had both relays and bells connected to it. As it is, using equal groups, it would seem that the number of line wires required would be twice the square root of the number of stations.

727,703—C. B. Smith, electrical signaling or calling system.

This is an extension of the idea just described, the number of sub-stations being doubled for the same number of wires,

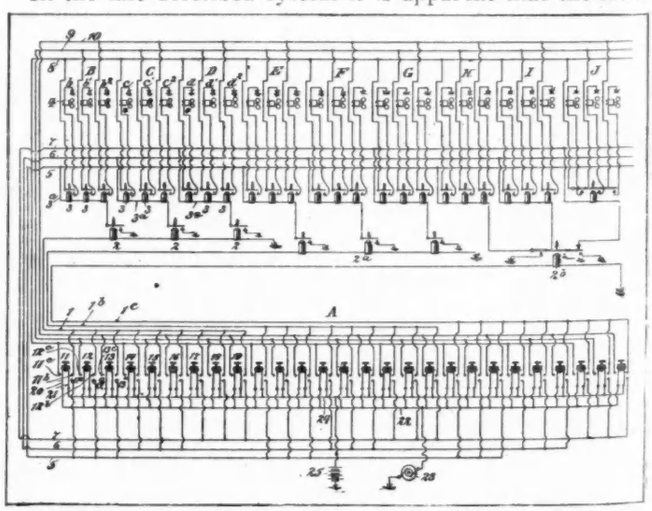


727,703—ELECTRICAL SIGNALING OR CALLING SYSTEM.

however, by polarizing the relays. A detailed description is hardly necessary. The keys *b, c, d,* etc., at central correspond as before to the stations. Thus key *b* sends positive current over line wire *1*, which will work the first three relays *2*, the second group of three on that wire requiring negative current to operate them. This key also sends positive current over line wire *3* to the bells *B, B3, C, C3, D, D3*, the only one of which that has its circuit closed at the relay is *B*. Button *b3*, on the other hand, sends negative current over the same wires, which rings the bell at station B3.

727,704—C. B. Smith, electrical signaling or calling system.

In the last described system it is apparent that the number of stations may be again doubled by polarizing the bells so that they will respond either to positive or to negative



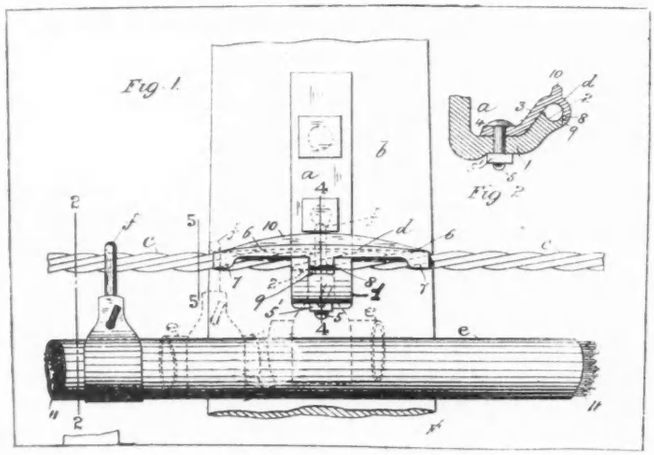
727,704—ELECTRICAL SIGNALING OR CALLING SYSTEM.

pulsating current, as the case may be. Mr. Smith has not done this, however, but he increases the number of stations by adding another group of line wires, so that the number of line wires required in any case will be three times the cube root of the number of stations. The first two groups of wires control the relays on the bells respectively as before. These groups are numbered *5, 6, 7* and *8, 9, 10.* He then adds another group *1, 1b* and *1c*, each containing relays, and each relay controlling the circuit of a group of other relays, each of which controls the circuit of one bell. If a key, therefore, as *11*, at the central office *A* is depressed and sends current over line wire *1*, the first group of relays *2* is selected. Current also going over the wire *5*, the first group *3* is selected, and finally current also going over wire *8*, the first bell *b* is selected. The principles are exactly the same as in the preceding cases.

MAY 19.

728,278—H. F. Neslage and H. H. Watson, telephone wire hanger.

This is called a cable hanger. It is intended for use principally on overhead lines, and really comprises a bracket or




728,278—TELEPHONE WIRE HANGER.

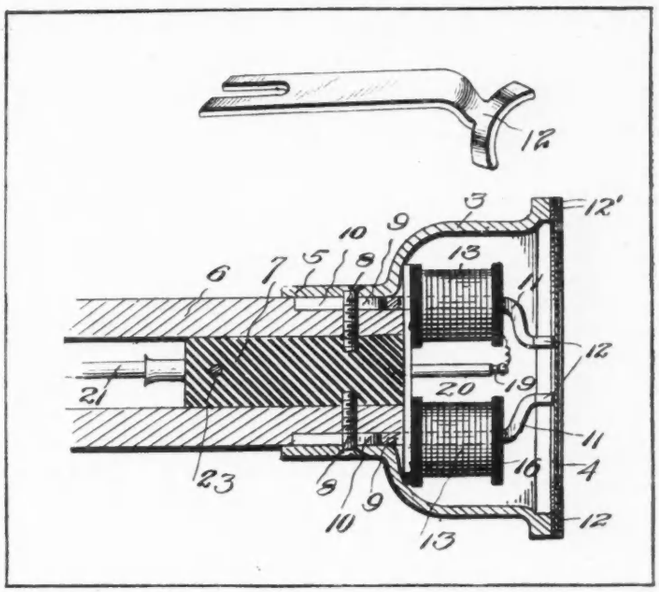
support for the messenger wire of such construction that the hooks of the cable hangers may pass freely along the line when the cable is drawn taut or moved along, thus avoiding the necessity of sending a man aloft to clear the hooks at the polls. In Fig. 1 *c* is the messenger wire supported in a groove *2* in the bracket arm *1*. An overlying member or clamp *d* is bolted down to the bracket by the screw-bolt *5*, not only holding the wire down against displacement, but extending along a considerable distance from *6* to *6*, and having a smooth top rib *10*, over which the hook *f*, of the hanger proper, can slide without obstruction. The device is very similar to the trolley wire supports commonly in use, turned upside down, and for a similar purpose. Fig. 2 shows it in section.

728,342—G. E. Wheeler, telephone receiver.

This is a receiver having pole pieces slotted at one end for adjustment on the magnet *6*, under the set screws *8*, and provided with T-shaped heads, *12*, curved around in an arc, where they meet the diaphragm. The spools *13* have metallic cores, and the inner end of each winding is connected to the core. Consequently when the spools are slipped on the pole pieces and the latter are connected to the magnet there is a circuit from one coil to the other without intervening wire. The outside connections are made to leading in wires secured to a block of insulation at *23*, as usual.

728,309—C. E. Scribner, coin collector for telephone pay stations.

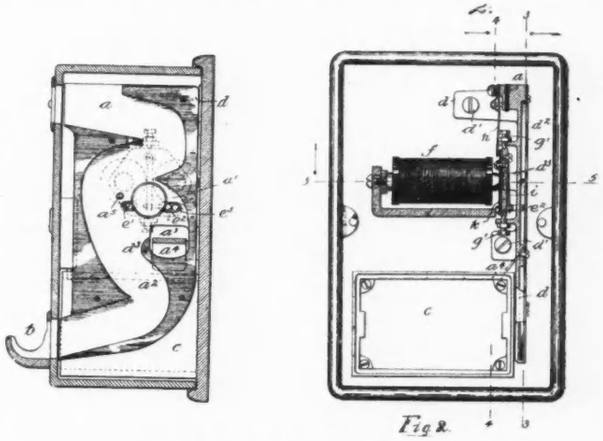
This is a toll station apparatus which is constructed to attain several very desirable ends. Coins that are too small are promptly returned. If the connection cannot be obtained the coin is returned. If a coin is already jammed in the machine other coins subsequently deposited will be at once



728,342—TELEPHONE RECEIVER.

returned. When the coin has been deposited and passed in or out the apparatus is out of circuit. The acceptance or rejection of the coin is controlled by the operator at central.

Inside a suitable box is a till *C*, and extending up from one side of this till is the coin chute *d*, formed of a flat base and cover plate and screwed to the back of the box at *d'*.




728,309—COIN COLLECTOR.

Carried on the base plate *d* is a polarized magnet *f*, having an oscillating armature pivoted above and below by pivot screws *g'*, and working exactly like the ordinary ringer armature except that it is kept normally centered by a double-leaf spring *h*, shown in Fig. 2. This magnet controls the disposition of the coin. If its armature swings one way the coin goes in the till. If it swings the other way it comes out.

The base *d* has the channel *a, a2* formed in it, commending with the slot at the top, see Fig. 1, where the coins are deposited, and then winding backward, forward, downward and forward. The middle part of the channel is widened out at *a'*, and into this wider portion, through holes in the

base, project the pins *e'*, *e2* and *e3*, all carried on the armature of the magnet *f*. The pins *e'* and *e3* are fixed, the latter being insulated and having a separate connection up through springs *h*, which are also insulated. The pin *e2* is pivoted and has a spring *i*, normally holding it away from the pin *e3*. When a coin is deposited it comes down through the chute *a*, strikes the deflector pin *a5* and falls between the pins *e'* and *e2*, forcing the latter against the pin *e3*, closing the circuit of the magnet. If the operator can obtain the connection desired she sends an impulse of suitable direction in the line circuit to tilt the armature so as to push back the pins *e2* and *e3*, whereupon the coin falls over to the right in Fig. 1, and upon a deflector *a4*, which guides it out through an opening *a3*, into the till, as shown in Fig. 2. If the connection cannot be obtained the armature is tilted the other way, pin *e'* is withdrawn, the coin falls down past deflector *d3* and comes out at *b*. If the coin is jammed in the chute other coins ride over it. If a small coin is put in it drops through.

The magnet *f* has pointed holes, and the armature has openings surrounding them so that a considerable range of movement is obtained. The spring *h* has double tension devices to balance it up.

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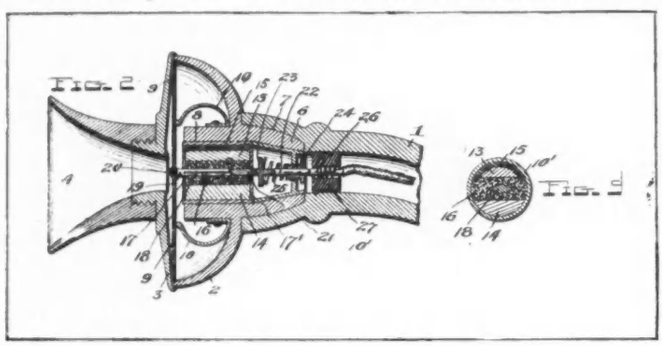
728,344—G. E. Wheeler, telephone transmitter.

This is a granular transmitter of a somewhat peculiar type. The electrodes are fixed in a "cartridge," and an agitator stirs up the carbon under the influence of the dia-




728,344—TELEPHONE TRANSMITTER.

phragm. Circuit is made through a spring contact in the arm, as in the old "Victor" transmitter.

Referring to the drawing, the numeral *1* represents the transmitter arm, provided with the casing *2*, closed by the cap *3*, carrying mouthpiece *4*. The casing *2* has a tapered rear portion *6* to fit within a corresponding socket *7* on the end of arm *1*. The diaphragm *9* is mounted in casing *2* and has damper springs *10*.

The rear portion of chamber *8* is interiorly tapered, and arranged within said chamber is a metallic shell *10'*, composed of a section *11* of uniform diameter, which fits snugly within the front part of the chamber *8*, and a section *12*, tapered to fit within the rear portion of said chamber, whereby rearward displacement of the shell is prevented. Inclosed within the shell are two carbon electrodes *13* and *14*, the electrode *13* insulated from the shell by a layer of non-conducting material *15*, while the electrode *14* is in direct contact with the wall of the shell, as clearly shown in Fig. 5. The granular material *16* is interposed between the electrodes and is in contact therewith and with the shell. The electrodes, the granular material and the insulation are held in proper relation by caps or disks *17*, *17'* of mica or other non-conducting material, which close the ends of the section *11* of the shell.

Extending through the filler of granular material, which is in a loose state, is a reciprocatory agitator *18*, which has at its forward end a contact piece *19*, which projects through the front disk *17* and is adapted to be engaged by a button *20* on the diaphragm, and at its rear end a projection *21*, which extends through the rear mica disk *17'* and is in engagement with a stem *22*, formed at its forward end with a head or collar *23* and mounted to slide at its rear end in an adjusting nut *24*, suitably mounted in the rear end of the tapered section *12* of the shell. A coiled, variable-resistance spring *25* surrounds the stem *22* between the head or collar *23* and the nut *24*, and is adjustable to vary its resistance to the rearward movement of the agitator through the medium of said nut. Electrical connection with the electrode *13* is made through a spring-pressed contact *26*, insulated from the casing by a non-conducting block *27*, while electrical connection with the electrode *14* is made through the shell, diaphragm-casing and transmitter-arm. Thus the electrical connections with the two electrodes are made without the necessity of including the diaphragm in the circuit.

As the diaphragm *9* vibrates under the action of the sound waves the button *20* on each inward movement of the diaphragm taps the contact *19* on the agitator *18*, thereby forcing said agitator rearward and transferring motion to the granular material *16*, the resistance of the agitator to such movement under the impulses of the diaphragm being regulated by the spring *25*, which returns the agitator to its normal position on each outward movement of the diaphragm.

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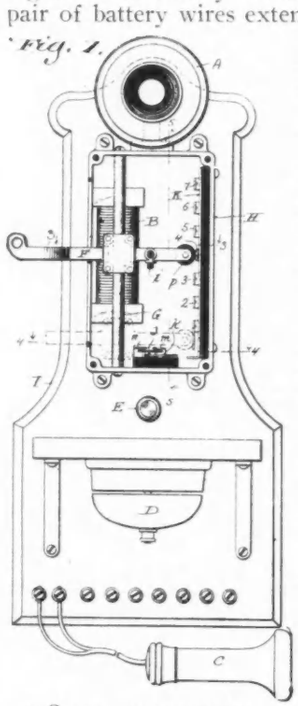
728,350—R. H. Yurgae, telephony.

This is an intercommunicating telephone system, employing common battery for both talking and signaling, with a pair of battery wires extending to all the stations, an individual wire for each station extending to all the stations, and for talking purposes one battery wire used as a common return. The station apparatus is somewhat novel, although the circuit seems not to be. This is shown in Fig. 1, wherein *I* is a backboard carrying a shelf or desk on which is mounted the monitor bell *D*, and above which is fixed the calling push-button *E*. Above this a rectangular box *H* is mounted carrying on top of it the transmitter *A*. This box contains the switches and the induction coils. The latter are of ordinary type and the former comprise the ordinary switch-hook contacts *j*, *k*, *m*, *n* and the selective line springs *1*, *2*, *3*, *4*, *5*, *6*, *7*. The latter overlie a common strip *K*, which is connected to the home telephone and also by a branch to a push-button, the other side of which goes to battery, as shown in Fig. 2. A post *G* extends the length of box *H*, and the entire switch-hook *F* is mounted to slide up and down on this post, having central opening to receive the same and friction rollers, as shown. Underneath the inside arm of the hook is fixed an insulating button *i*, which works the contact springs *j*, *k*, *m*, *n*, and on the end of the arm is a roller *p*, which rides over the selective springs *1*, *2*, *3*, *4*, *5*, *6*, *7*, pressing them successively into contact with the strip *K*. By moving the hook up and down, therefore, any one of the lines can be connected and by means of a friction break on the rear side of the arm *F* it is held where it is placed until the receiver is hung up when the break is thrown off and the arm is carried down to the dotted line

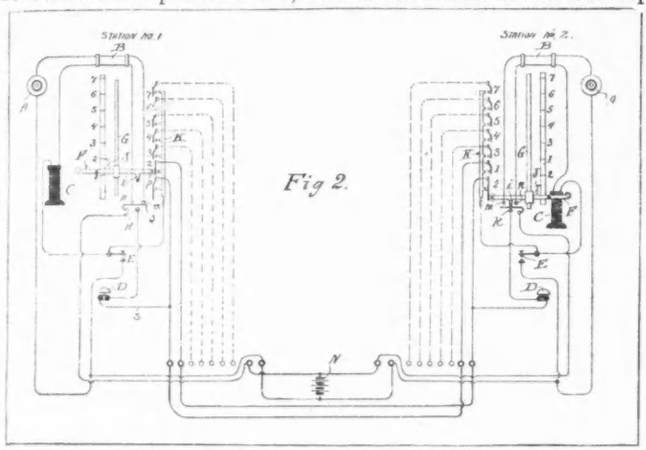



728,350—TELEPHONY.

position *4*, *4*, in Fig. 1. In this position the button *i* depresses the spring *j*, cuts out the telephone and cuts in the bell.

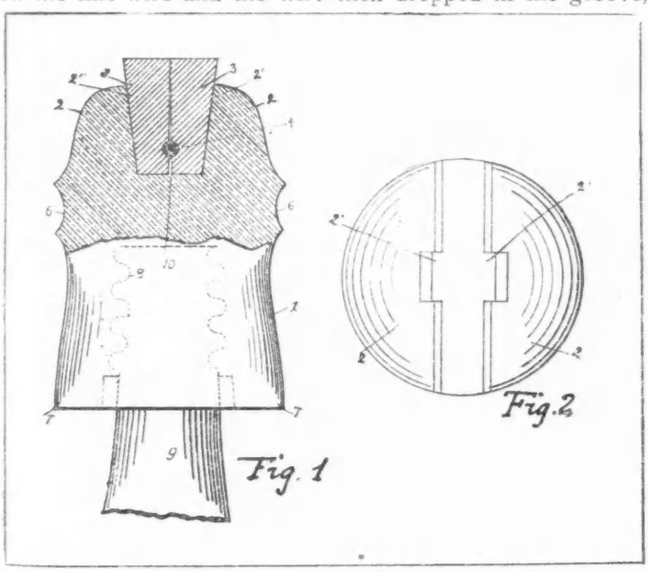
728,442—E. J. Burke, electric insulator.

This is an insulator requiring no tie-wire. The body *1* screws on the pin as usual, and is channeled across the top




728,350—TELEPHONY.

with a squared central opening *2'*, *2'*. A pair of wedges fits this opening, having registering corrugated depressions near the lower ends at *4*. The pair of wedges are clamped on the line-wire and the wire then dropped in the groove,

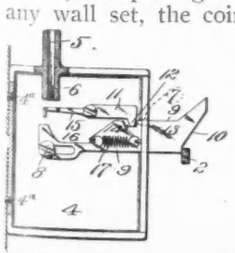



728,442—ELECTRIC INSULATOR.

the wedges being driven home in the squared opening *2'*. The material for the wedges is specified as galvanized iron.

728,478—Edward G. Lewis, telephone lock.

This is a device of a type which has recently come into notice, comprising a coin receptacle applicable to almost any wall set, the coins controlling a lock for the receiver hook to unlock the same only when a proper coin is deposited. Most of these seem to belong to the Controller Company of America of St. Louis.

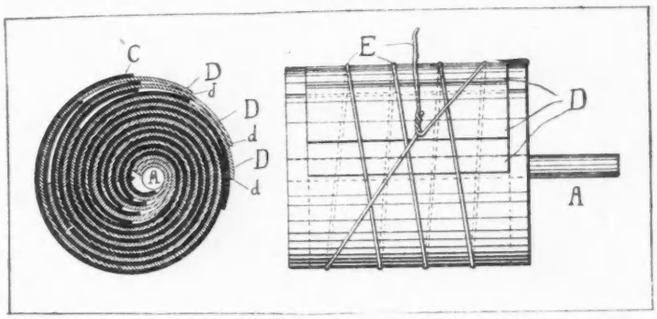


728,478—TELEPHONE LOCK.

In the present instance the apparatus is quite simple, consisting of a slide bar *9* and a locking-dog *11*. The slide bar *9* has its end *10* extending out with an inclined face overlying the switch-hook *2*, being held in that position not only by the locking dog, whose nose *12* falls by gravity into the notch *14*, but also by the spring *17*. When a coin is deposited it falls through the chute *5*, onto the arm *15* of the dog, and thereby unlocks the slide. If the receiver is then taken off the hook it acts on the face *10* as a cam and forces the slide back against spring *17*. When the receiver is again hung up the spring restores the slide to its first position shown and the dog again locks it.

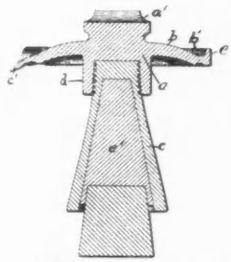
728,780—C. F. Splitdorf, condenser.

This is a condenser particularly intended for use in conjunction with spark coils, its characteristics being a compact cylindrical form and a certain facility of manufacture. Given a number of sheets of paper and the interleaved




728,780—CONDENSER.

sheets of tin foil, Mr. Splitdorf leaves the ends of all the negative coils protruding from the paper at one extremity and the ends of the positive elements at the other. He connects a wire or rod of metal *A* to one set of ends and then uses that for a core, rolling up the entire condenser thereon. When so rolled the other ends fan out, as shown in illustration, and he wraps a conducting wire or band around the outside, which not only holds the roll together, but forms the outside terminal thereof, the inside terminal being formed by the core-wire.



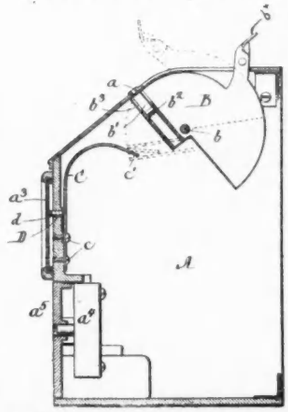
728,805—INSULATOR.

728,805—F. M. Locke, insulator.

This is a Locke high-tension insulator of the well-known type, with flat petticoat, provided with a raised flange *c* around the the edge and a spout *c'* to discharge water, etc., from the edge of the insulator to some distance.

728,833—E. P. Baird, signal device for telephone systems.

The Baird toll box is quite familiar to most of our readers. The coins are dropped into carriers, which are then pulled down by hand, and as the coin engages a strip of spring metal there is a very loud and harsh sound given, which is characteristic of nothing else in the world. The present invention is a Baird toll box with a screw *D* put back of the spring *C*, and the inventor says this improves the tone. The coin carrier is shown at *B*, the slot at *a*, the handle at *b4*; *a4* is the lock of the till. The screw *D* is adjustable and is covered by the false front *a3*.

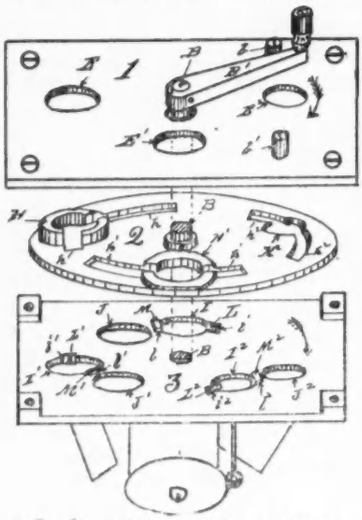


728,833—SIGNAL DEVICE.

728,964—W. S. Paca, telephone toll slot machine.

This is a toll box having open-

ings in its top for the deposit of coins flatwise, a crank serving to turn an intermediate disk with the coin deposited until the latter falls through an opening in a lower disk, ringing a bell in its movement around. In the drawing herewith *1* is the top of the toll-box, *3* is a lower parallel disk that lies up near the top, but is shown moved down out of position for clearness; and *2* is the intermediate disk. *B'* is the crank on a vertical shaft *B*, to which the intermediate disk *2* is fastened, to turn with it. The crank works between stops *b* and *b'*, The distance between the top *1* and the lower disk *3* is equal to the thickness of the thinnest coin, say the dime. Disk *2* has a hole *H2* for the dime, another, *H'*, for the nickel, and a third, *H*, for the quarter. The nickel and quarter openings have collars equal in height to the thickness of those coins respectively, and these collars find allowance between the top and the lower disk in curved grooves formed in the under side of the top *1*. The idea in this is that coins of exactly the right thickness must be deposited, for if any one is too thick the disk *2* will not turn until it is removed.



728,964—TOLL SLOT MACHINE.

In the lower disk *3* are formed the openings *I*, *I'* and *12* of the right sizes to take the respective coins named, and corresponding to the openings in the top, but spaced around therefrom in the direction of motion of the intermediate disk—see arrow. In advance of each opening is a slightly smaller oval opening, so that coins that are too small will fall through before they reach the proper openings. At the advanced edge of each opening *l*, *l'* and *12* is pivoted a bell-hammer lever, the heel of which is struck by the coin in passing and a tone produced according to the coin, the bells being of different pitches. At the far side of each opening is an upturned guide spring to guide the coin downward into the opening when it has traveled far enough. The crank *B'* cannot be turned back until it has completed its movement, when started, a pawl working in a ratchet for this purpose and being lifted onto a spring deflector at the end of the travel to allow the arm to be returned.

In operation suppose a dime is deposited. It falls through opening *E* in the top into the opening *H2* in the intermediate disk. The crank is then turned as the arrow indicates, and the coin is carried around over the opening *12* in the lower disk, passing over the opening *J2* on its way, and catching the hammer *M2* and so ringing the bell, and at the end of its travel falling through the opening *12* into the till, when the crank is returned by a coiled spring, not shown.

If the coin is too thin it will not ring the bell, as it will fail to catch the hammer heel. If too thick it will prevent the crank from being turned. If too small it will fall through without reaching the final signal opening. Finally, if too large it will not go into the top opening at all.

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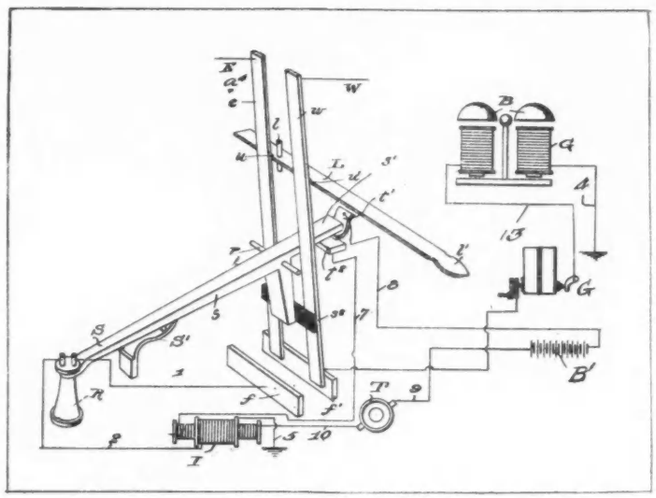
728,785—E. Umdenstock, telephone system.

This is a switch for intermediate stations in a series party line system, whereby the intermediate party can cut in his telephone on either the "east" or the "west" wire, cutting out the other, but not on both at once. The figure shows the parts in diagram at one station. *E* and *W* are the two line wires leading say east and west. *R* is the receiver, *T* is the transmitter, *I* the induction coil, *B'* the local battery, *G* the hand generator and *G*, *B* the ringer, all of usual construction. The hook switch *S* has a pivoted lever *s* pivoted at *p* and actuated by spring *S'*. Its rear end *s'*, when the receiver is lifted off the hook, closes the transmitter circuit at *t'*, *t2*, and it carries an arm of insulating material *s2*, which normally presses the springs *w* and *e* against the ringer-generator terminal *f'*. Lying behind the springs *w* and *e* and pivoted between them at *1* is a tilting hand lever *L*, the end *l'* of which comes out through a slot in the front of the bell box of the set. After the hook *S*



728,785—TELEPHONE SYSTEM.

is up, if the lever *L* is pushed to the right by its handle *l'*, it will throw spring *e* against the strip *f*, this being the terminal of the talking set, thus cutting in the station telephone on line wire *E*; and conversely, if the lever *L* is pushed to the left it will force the spring *w* against the strip *f*, cutting in the telephone on the line wire *W*. In either case the other spring, *w* or *e*, will remain in an intermediate position between contacts *f* and *f'*, so that it is not possible to tap both wires at once.

With this switch listening to a through conversation is obviously impossible. The ringer and generator are bridged from both line wires to ground, however.

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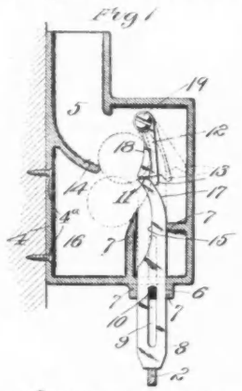
728,994—W. H. Scott, telephone lock.

This is another lock of the type referred to above. It comprises a toll box fitted to the backboard of a telephone so that its locking member lies over the switch-hook, which is held down until a coin has been deposited. In the figure *2* is the switch-hook, in section (looking toward the side of the telephone box), and *4* is the toll box above it. A chute *5* extends down into this, and in front of the chute is a pivoted locking dog *12*, whose lower end normally lies over the upper end *11* of a vertical slide bar *8*, having a slot *9* working in a limiting pin *10* and a curved face *15*.

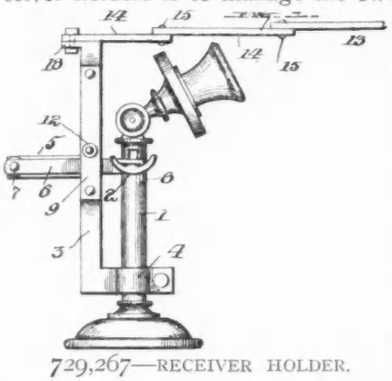


728,994—TELEPHONE LOCK.

When a coin is dropped in the chute it falls against the dog *12*, pushing the same back so that the coin rests on top of the bar *8*. As the latter rises, owing to the force of the switch-hook spring pushing it up, the coin falls past the curved face *15* into the till. When the receiver is hung up the parts fall back into the position shown.

729,267—A. J. Briggs, telephone receiver holder.

This is another form of the device Mr. Briggs recently patented. The problem with the average inventor of receiver holders is to manage the switch-hook. The receiver being supported independently of the hook, the function of the latter is gone, and the holder must do the work. Mr. Briggs retains the switchhook and operates it by a mechanical connection on the holder. The latter consists of a vertical standard *3*, clamped to the stand of the instrument at *4*, and supporting the extensible bracket *13*, *14*, *15*. The receiver is clamped on the end *13*, of this bracket. A lever *6* is pivoted at *7*, on an arm *5*, of the standard, and extends forward over the switchhook *2*, passing under a latch *9*, on the way. The latch is an ordinary spring latch which holds the lever *6* down, and so keeps the switchhook depressed, and it is controlled by a button *12*, by pulling which the hook is permitted to rise.

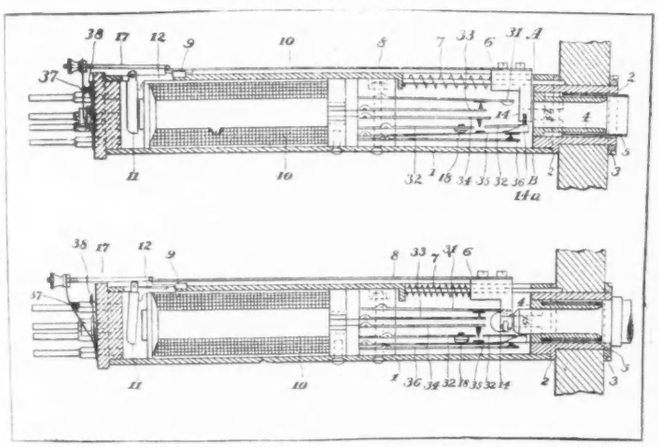


729,267—RECEIVER HOLDER.

JUNE 2.

729,560—Lars Magnus Ericsson, signalling jack for multiple telephone exchanges.

This is a combined drop and jack of the Swedish type. The patent is assigned to the Swedish Company. The structure comprises an iron tube *1*, containing the magnet coil *10*, with its armature *11*, and latch *12*, working a catch *9*, for the slide rod *8*, whose rear end controls the night



729,560—SIGNALING JACK FOR MULTIPLE EXCHANGES.

alarm springs *37*, *38*, and its forward end is connected to a slide block *6*, working with the sleeve *5*, being thrown forward when released by the spring *7*. Block *6* has prongs that close test springs *35*, *36*, together in the forward movement, thus completing a test circuit to all the multiple jacks as soon as a call is made, while the protruding sleeve *5* serves as the annunciator drop or signal. When a plug is inserted it presses the sleeve *5* back, and thereby restores the block *6* and its connected parts, latching the armature for another call, and also keeping the springs *35*, *36*, together to maintain the test circuit closed. *31*, *32*, are the line springs, and *33*, *34*, the terminal springs for the magnet, constituting the cut-off for the latter when the plug is in the jack. The claims seem to be specific.

729,709—Howard S. Warren and George A. Campbell, loaded electric circuit.

Loaded line circuits, that is, those provided with inductance coils for balancing and neutralizing adverse capacity effects, have been much discussed of late, and the name of Professor Pupin has been brought into much prominence as their originator. The present invention concerns such circuits, and particularly relates to the diminution or reduction of the effects known as "reflection," which varying currents experience when transmitted through heterogeneous circuits, or those having different sections of different characteristics.

It is now well known that when an electric wave or a train of electric waves traveling along a heterogeneous circuit passes from one portion of the circuit having a well-defined character to another of different character, a reflection of the waves occurs at the "point of heterogeneity," where the change in character occurs, and the reflected waves tend to travel back to their place of origin instead of proceeding to the farther end of the circuit. Experience has demonstrated that when a comparatively short unloaded

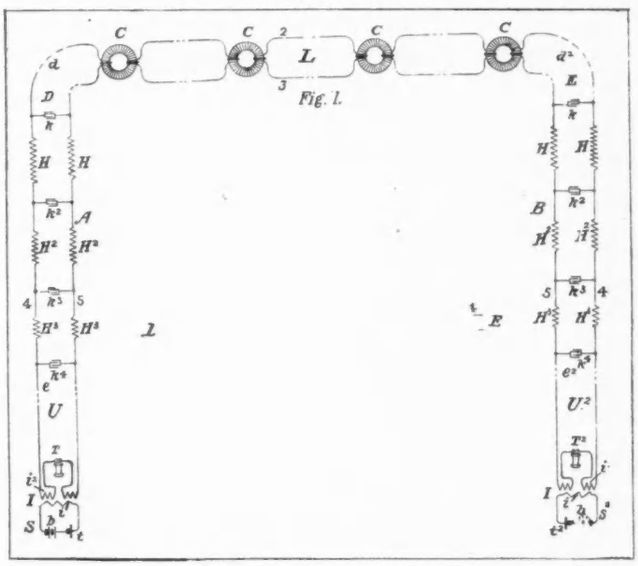


Fig. 1.

729,709—LOADED ELECTRIC CIRCUIT.

line is connected to a long loaded line circuit a decided loss in efficiency occurs. Thus, in telephone work the subscriber's apparatus is usually connected to the long distance loaded line not only through his own simple unloaded line circuit to central, but very probably also through a trunk line, and under such conditions a loss in efficiency is said to be clearly manifested, due to reflection of waves accruing from the abrupt change from the high impedance of the loaded circuit to the low impedance of the local line circuits. The object of the present invention is to prevent this loss, and the means adopted comprise a gradual taper of the impedance of the connected circuits from high to low, without the abrupt change. The invention therefore consists in a "localized taper constituted of a plurality of self-induction coils connected in series in a circuit-conductor adapted to be placed in a combined circuit between the regularly loaded portion and the station or continuation circuit and a group of associated condensers in parallel branches of said circuit conductor, the inductances of said coils and the capacities of said condensers being so arranged and relatively proportioned as to provide a succession of sections or elements of gradually or progressively changing impedance, the different values of said impedance sections of course increasing as they progress toward the loaded portion of the line and diminishing as respects transmission

from such loaded portion of the circuit and toward the unloaded portion thereof."

The specification of the patent is very excellently written and well repays reading. In the drawing, herewith, the loaded line is shown at *L*, its "load" consisting of impedance coils *C, C, C, C,* having opposite windings on the same core in each case. *U* and $U_2$ are the terminal unloaded sections, such as subscribers' stations, and are shown fitted with telephone apparatus $T_2$, $t_2$, etc. Between each short local line *U*, or $U_2$, and the main line, *L*, is interposed a connecting circuit comprising sections *H*, $H_2$, $H_3$, of diminishing impedance toward the ends. Condensers *k*, $k_2$, $k_3$, $k_4$, are bridged across the circuit between the impedance coils, the coils being shown as commencing at *H*, with many turns, and finishing at $H_3$, in each case with few turns. It is stated that where the impedance of a given length of the main line, corresponding to one section of the taper, is, say, three thousand ohms, and where the taper is to comprise, say, six sections, the impedance values of the sections would be, commencing at the end to line, two thousand four hundred, eighteen hundred and fifty, fourteen hundred and twenty-five, eleven hundred, eight hundred and fifty, and six hundred and fifty ohms, respectively.

Of course the transition from loaded line to terminal connections could be made, and is sometimes made, through a repeating coil, but it is stated that the taper method is more efficient.

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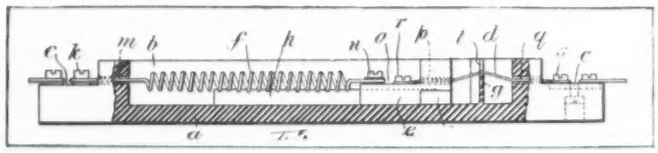
729,729—W. P. Burke, fusible electric cut-out.

This is a non-arcing fuse arrangement. A casing *a* is channelled out to make a slide bed for the carrier *e*, which is tied back to the terminal *k* by the spring *f*, which tends to pull it to the left. The carrier has projections that



729,729—FUSIBLE ELECTRIC CUT-OUT.

fit under flanges in the groove of the bed, to keep it down. A bridge *g* is raised across the end of the channel, and the fuse is held taut across this bridge from the carrier *e* to the terminal *s*. On the fuse blowing, the carrier is instantly drawn back by the spring *f*, thus separating the ends of the fuse widely and preventing arcing.

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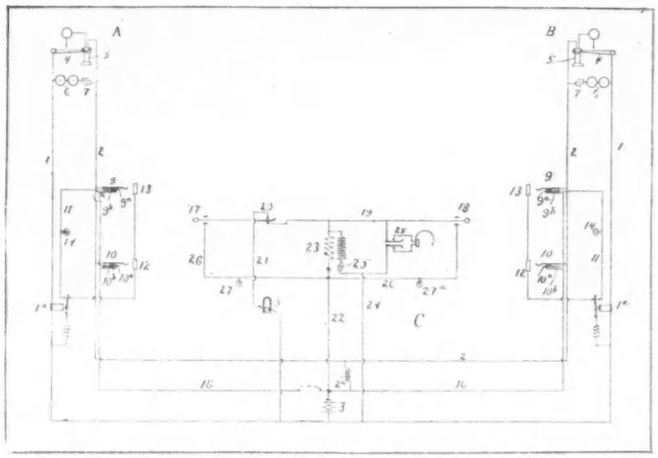
729,801—C. B. Smith, telephone exchange system.

This is a common return common battery multiple board system, with line signal cut-out in the jacks. In the drawing *A* and *B* are subscribers' stations, having the usual outfits. Line wires *1* and *2* pass to central, the former being there connected to a relay *1a*, which controls both the line signal lamp *14* and the supervisory lamp *27*. The circuit of lamp *14* passes to the cut-out springs *10a*, *10 b*, of all the multiple jacks, and the sleeves are connected to the back contact of relay *1a*. The sleeves of the plugs are connected through supervisory lamps *27*, *28a*, to the battery *3*, on the negative side. The positive side, it will be observed, is to line wire *1* in every case. The cord circuit has but one talking strand, the common return from wires *1* being used for conversation, with the line relays left in, their impedance being apparently considered negligible. From tip strand *19* to battery is a connection *22*, with the winding *23* of repeating coil. The secondary of this coil is connected from common return to tip strand through condenser *25*, and it is claimed this parallel arrangement works both ways. The operator's set is connected from tip strand to one side of secondary of repeating coil, and to the common return wire. To test, if no plug is in a jack of the line wanted the sleeves are to wire *1*, and to the positive side of battery, which is also connected to the operator's set, so no difference of potential is found. If a plug is in, the negative side of battery is to the sleeve of jack by way of wire *26* and sleeve of plug. Touching the tip, therefore, gives a click. As long as the subscriber has the line in use current flows through relay 1a and it holds up its armature, hence the supervisory lamp remains dark. When the line



729,801—TELEPHONE EXCHANGE SYSTEM.

circuit is broken by hanging up the receiver, the armature falls back and the supervisory is lighted. Pulling out the plug restores it to innocuous desuetude.

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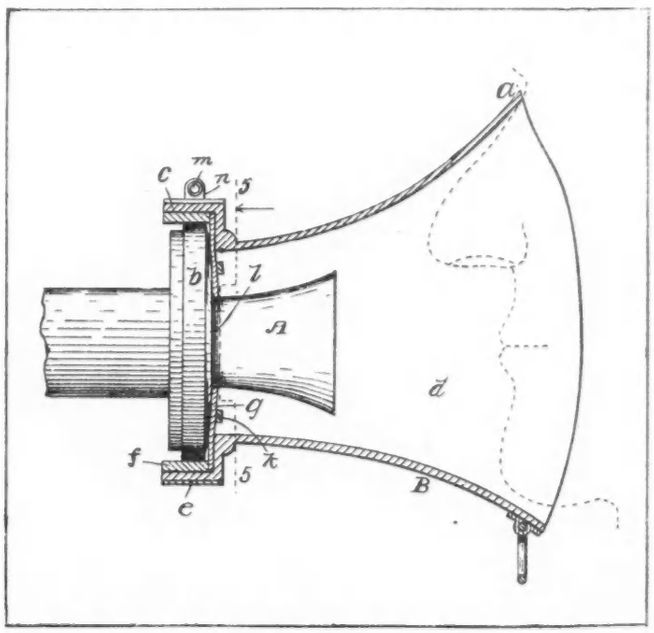
730,101—W. J. Dunihue, vocal guard for telephones.

This is not a picture of a gentleman talking through his hat. The seeming hat is a papier mache or rubber affair attached to the mouthpiece of the telephone transmitter, with the idea that by inserting the face therein privacy will be obtained. The apparatus would be impracticable for the



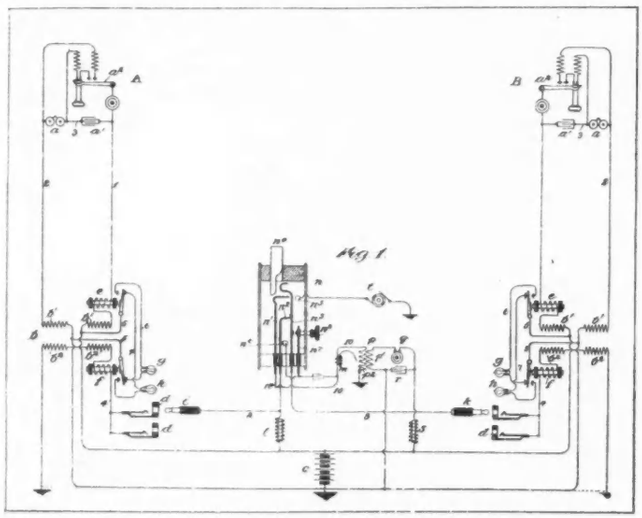
730,101—VOCAL GUARD FOR TELEPHONES.

German language, on account of the length of words and the necessity of catching the breath. There is no ventilation contemplated apparently. The guard is supported on the transmitter by a clamping ring and has a split disc to surround the mouthpiece.

JUNE 9.

730,291—J. J. O'Connell, telephone exchange system.

By a singular coincidence this is a common return common battery telephone system in which the line relays work both line and supervisory signals, in the same fashion that Mr. Smith's system, just described, contemplates. Mr. O'Connell, however, puts a repeating coil, $b'$, $b'$, $b_2$, $b_2$, in each line, line wires *1*, *2*, connecting with coils $b'$, $b'$, the other ends of which are connected to battery *c*. The other windings, $b_2$, $b_2$, are in series, grounded on one side and on the other connected through a controlling relay to the multiple jacks, which have a single contact each. The cord *3*, *3*, is a single strand, and the ringing and listening key



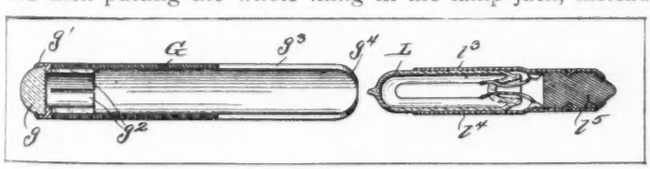
730,291—TELEPHONE EXCHANGE SYSTEM.

*n* has the usual springs all single. Normally the cord is continued through the springs $n_2$ and $n_3$ of this key, and a slight depression of the button brings telephone spring $n'$ against *n3*. Button *n8* is for test. Full depression of the button cuts in calling generator *t* on spring *n3*, taking the latter away from the other springs at the same time.

A call by taking down the receiver causes relay *e* to pull up its armature and light lamp *g*. The plug *i*, when inserted, then connects battery to relay *f*, and through the coils *b2* to ground. This relay *f* breaks circuit *6*, of lamp *g*, and connects one side of lamp *h* to battery. Thus when the line is again opened at the conclusion of the conversation the relay *e* will let go its armature and lamp *h* will light for disconnection. Battery *c* is bridged across between the coils on each side of each repeater, it will be observed, and the relay windings *e* have to be talked through.

730,287—W. E. McCormick, telephone switchboard.

This is a lamp signal and bull's-eye. The invention lies in making an insulating sleeve *G* with the jewel or bull's-eye in the end, and slotted at *g3*, putting the lamp *L* in this, and then putting the whole thing in the lamp jack, instead

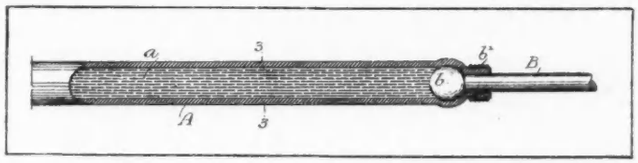


730,287—TELEPHONE SWITCHBOARD.

of putting the lamp alone in the jack, and putting the jewel on afterward. The inventor claims the light is better concentrated by each jacket on its own jewel. The terminals of the battery circuit reach the lamp contacts *14* through the slots *g3*. The lamp jack is of usual construction.

730,847—L. Van Gilder and E. M. Post, flexible electrical conductor.

This is a flexible conductor composed of a rubber tube filled with mercury or amalgam, and having solid metal tips *B*. *A* is the tube and *a* is the mercury. The inventor says an important advantage is that if an excessive current passes the rubber tube will melt and let the mercury out. This



730,847—FLEXIBLE ELECTRICAL CONDUCTOR.

may be a good thing for some kinds of apparatus that require flexible connectors, but it would be quite unpleasant to have a quantity of mercury turned loose in the night in a switchboard of the common battery relay type, or any other type, for that matter.

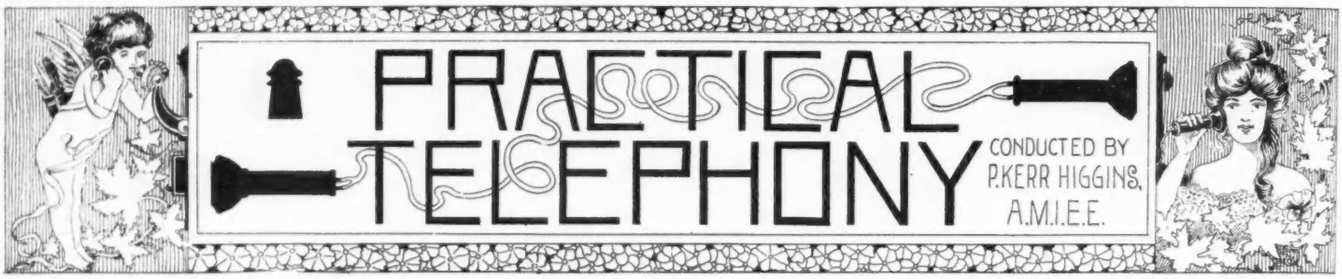
## STERILIZE THE TELEPHONES.

Is infection derived from the use of the telephone? The present agitation against the spread of consumption will bring the question forward in England sooner or later, says the Pall Mall Gazette. The French postmaster-general has recently ordered that "receivers and transmitters in the telephone cabins must be sterilized by carbolic acid each time they are used." On the continent legislation, in view of the spread of consumption, is stringently enforced. In London by-laws are being passed to prevent spitting in public places, but telephones up to the present time have been entirely ignored.

Observant users of the telephone will have noticed that after a few seconds' conversation into the instrument the breath is condensed and minute liquid globules are formed on the surface of the ebony cup of the transmitter. These globules quickly evaporate. Should there be any germs of disease in these globules they would be left dry on the cup, and the next user of the instrument, in speaking into the transmitter, would scatter the germs into the atmosphere and inhale them. Is it not possible that the second person may contract any lung disease that the previous user was suffering from?

Nor is the transmitter the only part of the instrument that might be the means of spreading infectious diseases. The receiver is, if anything, the more dangerous, as it comes into immediate contact with the person. Eczema, the most common of skin diseases, is, according to Dr. Ruddock, more general behind the ears and on the scalp. There are also many other skin diseases that attack the head, and which are infectious and likely to contaminate the receiver of the telephone. All are aware of the danger of infection when any one is in the desquamation period of scarlet fever, smallpox, etc., and how easy it is for persons to carry contagion about them in the hair or clothing. How often has scarlet fever attacked the whole of the staff of a business firm! Is it possible that one had the fever at home, and communicated it to the others through the use of the telephone? No doubt the French postmaster general considered that "prevention is better than cure."

The telephone is preparing to compete with the well known conversational powers of the barbers. In the Plankinton House barber shop at Milwaukee each chair has been equipped with a complete telephone set, and patrons, whenever so disposed, may now escape from tonsorial torture by calling up the outside world and pretending to transact important business by wire.




It is now common practice to step all poles, and this should be done at the time of cross-arming. By doing this, the wear and tear of poles is considerably reduced and they are rendered more sightly, not being torn by the reckless use of climbers. It is customary to stagger the pole steps twenty-four inches apart, and they should continue from the lower cross-arm to about eight feet from the ground. The distance between poles in city work is usually one hundred and twenty feet, varying according to local conditions. As soon as poles are set in position the guying should be arranged for.

*Guying.*—In city work, especially on streets, all guying is done with regular guy wire and anchors, in alleys and in the country braces may also be used. The efficiency of all guying will be in direct proportion to the relative position of the guy wire or stub to that of the pole. In order to locate a guy to the best advantage, one must understand the laws of mechanics and a study of these will greatly aid the engineer when special conditions have to be met. As a rule, the acute angle formed by the pole should be halved for bracing and the obtuse angle for guying. As in guying for cable poles, so in all similar work, the nearer the guy is to the pole the greater the strain on the anchor. Several methods of anchor guying are in use; (1) A solid rod; (2) the made-up guy; (3) messenger wire; (4) bracing. Of these the third is perhaps the most popular, using an iron anchor rod in conjunction with it. Where the guy wire is fastened to the pole, protection should be afforded in the shape of a band of galvanized iron completely encircling the pole for about six inches. Both ends of a lead should be firmly anchored and in addition head guys should be set, varying in number according to the length of the lead. The side guys should be set at all turns in the route. All guy wire and fastenings should be well galvanized. The method of placing the guy stub was given in a previous paper. It is customary to attach side guys to poles—in the same manner as head guys—but it is found good practice to make the fastening in the "branch method," namely, fasten one branch to the head of the pole in the usual way and another branch just below the lower cross-arm or about six feet from the top of the pole. Where the regulation guy cannot be erected a special guy may be arranged by fastening one end to the foot of the pole and the other end on the top with an outrigger in the center so arranged on the side opposite to the pull as to keep the guy about two feet away from the center of the pole and causing the strain to be on the butt of the pole. Where the strain is very heavy a pole of structural iron or steel may be used; this may be made of two beams securely bolted together. When poles go off at right angles, two guys should be used, one in each direction. All guy stubs should be set in the ground six feet, and so set as to lean away from the pole; all anchor logs should be covered with rocks before filling in, the log being at least eight feet long and fifteen inches in diameter. The guy wire used is generally made up of seven strands five-sixteenth inch steel rope and is tightened by means of block and tackle, then held in place with a galvanized iron clamp. At the anchor end a thimble is provided. As shown previously guy stubs may be used in locations where it is desirable to raise the guy to clear obstructions. On straight line work, it is customary to place double head guys and double side guys every mile. If the line is a heavy one additional guys may be added as found necessary. The object of all guying must of necessity be to distribute the strain as uniformly as possible over the entire lead. The following general rules may be of service in ordinary guying:

1—The end of the guy wire shall be fastened to the pole with two wraps, seven inches from top.

2—All clamp connections should be made tight.

3—Wherever possible use the "branch" or Y guy.

4—When the guy passes through the eye of the guy rod it must rest on a thimble.

5—When fastened to a guy rod place clamp six inches from the rod.

6—When two guys pull in same direction the strain (or pull) must be uniform on both.

7—Where line changes from one side of street to the other two head guys may be used on the two poles preceding

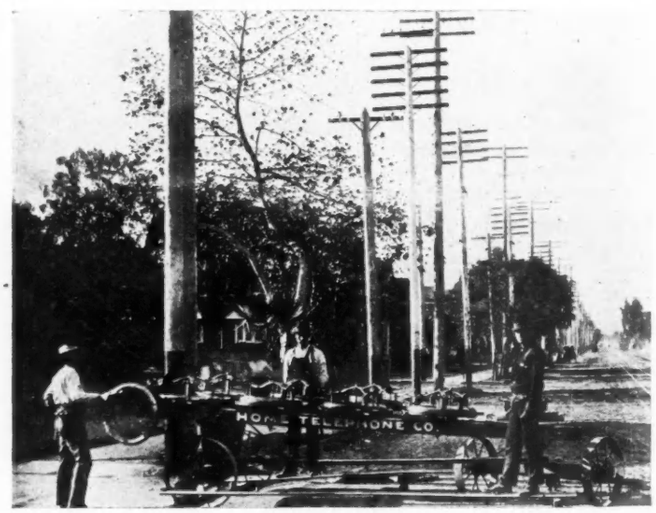



FIG. 1—REEL WAGON, TEN REELS.

and after the change, or one head guy and one side guy on each side of the change, the head guys being in same line with poles and the side guys at right angles to the poles.

8—All terminal poles should be in line with the lead and be held in place by two head guys in same direction as pole line, the next pole being similarly guyed and the third pole with one head guy only. In each case the head guys may be fastened to the butt of the pole preceding, counting from terminal pole about six feet from the ground.

9—All thimbles should be three-thirty-seconds of an inch iron and three inches over all.

10—Guy rods eight feet and not less than five-eighth inches in diameter.

11—Guy clamps three bolt and fitted to hold five-sixteenths inch guy wire and have a breaking strain of not less than 60,000 pounds per square inch.

12—The fastening of guys to trees or buildings should be avoided.

All guying having been completed and the pole fittings on, the lead is now ready for stringing the wire.

*Stringing Wire.*—This is usually done by mounting reels on a cart or wagon as in Fig. 1 where is shown a reel wagon fitted up to permit ten wires being strung at one time. This allows a whole cross-arm to be done with one pull; is convenient and economical. After the wires have been strung and left a short time to settle, they are pulled up and tied into the insulators by means of soft tie wire of the same kind and size of wire as the main line. The proper tension is given to the wires by means of block and tackle or a "come-along" attached to a differential block. In the case of copper wire, it is customary to use copper eccentrics so arranged as not to injure the "skin" of the wire. The amount of sag allowed varies according to the length of the span and the temperature. The following table gives some idea of that generally allowed. As a rule, the eye once trained to it, will govern the proper sag.

LENGTH OF FEET IN SPAN.

| Temp. Fahr. | 100 | 110 | 120 | 150 |
|---|---|---|---|---|
| 30 | 2½ | 3 | 3½ | 4½ |
| 10 | 3 | 3½ | 5 | 5 |
| 30 | 4 | 4½ | 6 | 7 |
| 60 | 6 | 6½ | 8 | 12 |
| 80 | 6½ | 7 | 9 | 14 |

*Copper Wire.*—Copper wire is now almost universally used for telephone purposes, No. 14 E. L. S. being generally used for city work, the specifications for such wire calling for an elongation of eight-tenths of one per cent in five feet, number of twists in six inches thirty-five and a conductivity not less than ninety-eight per cent that of pure copper. This is usually put up in coils of 3,000 feet. Copper, unlike iron wire, requires great care in handling and only experienced men should be entrusted with its erection. The use of proper tools is also very necessary, because of its susceptibility to mechanical injury. Its tensile strength is materially reduced by breaking the skin and it is easily burned by friction due to rubbing, by a loose tie wire or other cause. This skin is only one-thirty-second of an inch thick, so that the necessity for careful handling is apparent. The following is the test usually required on all copper wire:

| | No. 12. | No. 14. |
|---|---|---|
| Diameter in inches | .104 | .080 |
| Elongation | .9 | .8 |
| Twists in six inches | 40 | 35 |
| Bends on itself | 3½ | 3 |
| Weight per mile, pounds | 175 | 110 |
| Resistance per mile | 4.8 | 7.92 |
| Breaking strain | 555 | 350 |

*Tying In.*—The method of tying in, most commonly used is to place the wire in the groove of the insulator and pass a soft copper tie wire around the insulator in the groove. The ends of the tie wire are then passed one under and one over the line in opposite directions., crossing each other and then twisted four times around the line wire. In dead ending the line wire, use a one-half McIntyre copper sleeve, making two twists using copper connectors for the purpose. Two pair are usually used, one to hold one end of the joint and the other to twist it. In splicing the two ends of a line together the whole sleeve is used and three and a half twists are made. The free ends after twisting are cut off a quarter of an inch from outlet of sleeve, and bent up.

*Transpositions.*—In city work, transpositions are seldom necessary except on long interurban lines, but on toll lines it is nearly always necessary to do more or less of this work. Transposing, as the name indicates, is the changing of location. Where long lines run parallel to each other, or other foreign lines carrying high tension currents, there is more or less induction, cross talk or noise. To remedy this, transposing was introduced and works very well. The object of changing the relative location of wires to each other, or neighboring circuits, is to neutralize the accumulation of induced currents. No definite rule can be laid down, except the conditions are absolutely uniform throughout the entire line, but if such is the case, the transpositions shown in Figs. 2 and 3 would apply and these form the basis of all transpositions, keeping always in view the fact that in order to obtain a quiet line the same length of line on both sides of the circuit must be exposed to the disturbing wire. It is customary to name the transposition poles B. A. B. C. and

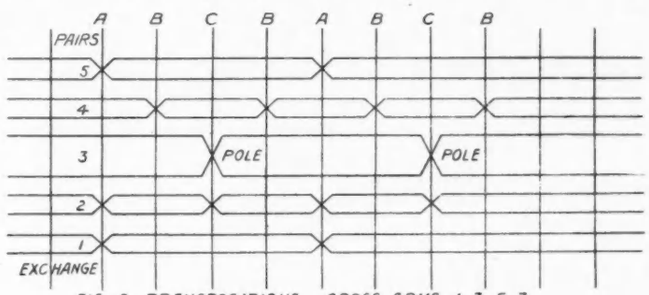


FIG 2 TRANSPOSITIONS CROSS ARMS 1-3-5-7.

transpose each 1,300 feet, beginning always with the letter B. Long lines usually require less transpositions than short ones. The figures show the plan for two cross-arms and the same is repeated for the third and fourth, and so on. The proximity and length of paralleling of wires foreign to the lead itself will regulate any changes necessary in this arrangement, but great care should be taken not to disturb the balanced condition between pair and pair in the lead itself. Should noise or cross talk present itself it is usually indicative of an unbalanced condition and may be due to one of three things: (1) Low insulation on one or more of the circuits; (2) some new line run parallel to the lead; (3) one or more transpositions cut out by careless workmen.

It is essential in a well-balanced lead that the insulation be high, and the resistance of each side of each and every circuit be as nearly uniform as possible. This does not mean that all the circuits be of the same resistance, but that the two sides of each circuit be alike. The writer has frequently found conditions where an attempt at balancing was made with one side copper and the other iron wire. This cannot be done satisfactorily, neither can perfect balance be had with poor joints. It must not be supposed that transposing is a "cure-all," as some seem to think. Perfect conditions

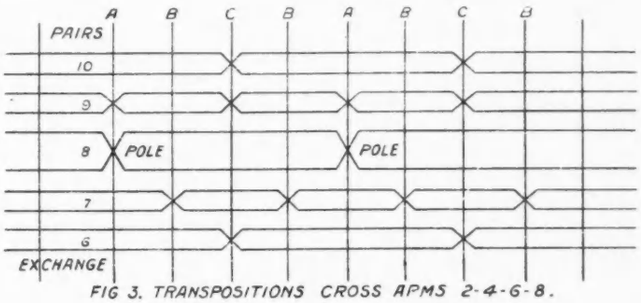


FIG 3. TRANSPOSITIONS CROSS APMS 2-4-6-8.

are required to attain the object in view and must be maintained. For this reason it is desirable, where important lines parallel high tension circuits for any great distance, to remove them beyond the sphere of influence. By doing this, the trouble is absolutely removed with transpositions. Trouble is liable to present itself from time to time, caused by one side of a circuit becoming opened or grounded. The numbering of poles is done by turning the back to the central office and counting from left to right, but in an extended system of toll lines it is found better practice to create a center and number from this, east, west, north and south, as the case may be; this enables the relation between the

transposition to be maintained throughout the entire length of any and every line. All transposition poles should be numbered and lettered for the convenience of the trouble-man and also for testing purposes by the wire chief. The best and most simple way of numbering is by pair numbers. Transposing is done by the use of half-sleeves, McIntyre joints, the same as deadending, except that enough wire is left to pass over to the other pin or insulator, where it is made up in the same manner. Great care should be taken to prevent contacts, otherwise a "short" circuit would be

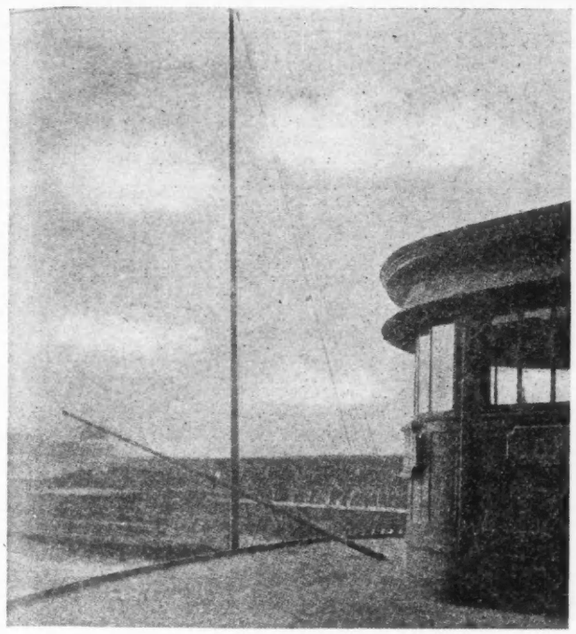
Special insulators are provided for transposing, composed of two parts, but these are expensive and are not always a necessity, as a good double groove petticoat glass insulator will serve all ordinary purposes and is much cheaper.

# The Collins' System of Wireless Telephony.

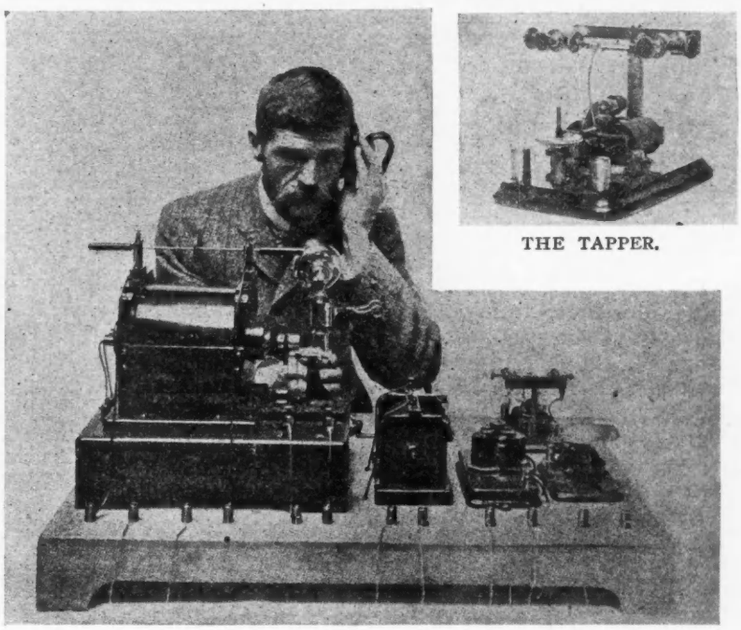
The electrical transmission of speech to a distance without the intervention of wires was given a commercial test recently when Mr. A. Frederick Collins telephoned between two ferry boats which were moving in opposite directions on the North River between Jersey City and New York.

The test was the culmination of a long series of experiments begun three years ago at Norbeth, Pa., and continued to the present time. During the past summer Congers and Rockland Lake, N. Y., served as a proving ground, but during the winter Mr. Collins transferred the scenes of his activity to the city. In April, he proposed to the officials of the Erie railroad to apply his system to the boats of their ferry. Mr. Collins was given every facility to carry out his plans. He made a beginning by carefully studying the needs of the service in this regard and by thoroughly inspecting the conditions under which he would have to work. He learned that there were, as regards the ferry boats at least, two kinds of bottoms, iron and wooden; but the wooden bottoms, while rendering it easy to attach the contact plates which are a part of the system, were surrounded at the water line by a continuous sheathing of copper 36 inches wide. Deeming it possible that the lines of force might be carried around this conductor instead of being propagated as the successful working of the apparatus requires, he decided to use the iron bottoms, though this would involve the use of other means of contact than the securing of the plates to the boats' hulls. There was also an uncertainty as to what effect this immense mass of metal would have in deflecting the current from the desired direction. Mr. Collins was working under absolutely new conditions. Experience proved that the iron bottoms held no inherent difficulties for wireless telephony; but an unexpected difficulty arose indirectly on their account. In Mr. Collins' system the contact with the water should be made by means of copper or zinc plates, each having a surface of several square feet. It being impractical to have the boats laid up in drydock for the purpose of attaching such plates to the boats' bottoms, it was at first thought feasible to attach the plates to their wires and throw them overboard; but greatly to the surprise of everybody concerned, though the plates weighed ten pounds apiece, they were prevented from sinking by the rapid movement of the boat. In consequence, the contact pieces were finally replaced by a few inches of heavy copper tubing which was let down the rain pipes to the water. The tubes danced upon the surface of the water as the plates had done, the circuit was repeatedly broken,

RECEIVING A WIRELESS TELEPHONIC MESSAGE.



PILOT-HOUSE DECK SHOWING ANTENNAE.



GENERAL VIEW OF THE TRANSMITTING APPARATUS.



THE TAPPER.

and at no time did they make a really satisfactory contact with the element.

In general it may be said that the system consists in antennæ as in wireless telegraphy, earth plates—i. e., water contacts—the transmitting apparatus and the receiving instruments, all of which have been carefully written up by Mr. Collins himself and published in the *Scientific American* of July 18, 1902. The flagstaffs at the vessels' prows served admirably as masts for the antennæ and the steam radiators in the pilot houses answered for tables upon which to place the sending and receiving instruments. A battery of fifty cells, placed just outside the pilot house, furnished the current.

On Friday, May 8, everything was in readiness. Mr. Collins took his stand in the pilot house of the "John G. McCullah," where the transmitting instruments were installed. The writer and several other gentlemen were in the corresponding location on the "Ridgewood" with the receiving device. As the boats approached within five hundred feet of each other the voice of Mr. Collins was distinctly heard. "Hello, hello. This is the Collins wireless telephone. Do you hear what I say? One, two, three, four, five. That's all. Good-bye." The following day—the 9th—the first public demonstration was given and amid the usual harbor and river sounds—the tug and other whistles, the swish of waters, etc.—the articulations of Mr. Collins' voice came over distinctly from the "McCullah" to the "Ridgewood."

The contact with the water, as before mentioned, was neither sufficient nor constant and the current used was inadequate. In permanent installations there will be no difficulty in attaching the plates to the hulls. Where a strip of copper surrounds the boat a vertical slit would be made through the copper on either side and then each half would serve as a contact plate, it being necessary in such case only to make the proper connection.

For current, the cells would be discarded. Either a transformer employed in connection with the boat's dynamo or a motor generator set will be used.

Two or three questions suggested themselves to those who witnessed the performance. "How far can you telephone by this system?" "Why isn't the wireless telegraph better for this purpose?"

When the experiments were being conducted at Congers th writer heard articulate speech distinctly over a distance of 6,000 feet. In the harbor, where the conditions are all different, Mr. Collins will only state at present that he can cover 1,000 feet. But as he and others have pointed out, for harbor and river purposes it is not great distances which are called for. Boats do not ram each other at great distances. In the uncertainties of a blinding snowstorm or during a fog when the pilot cannot see the prow of his own boat, if he could telephone the vessel nearest to him, though he could only learn her name and the direction in which she was going he would be greatly assisted; but when he might learn also where she stood by the compass, the one could steer a few points to the right, the other a few points to the left, and the sickening disasters with their losses of human life which occur time and again in every harbor would be largely avoided. The wireless telegraph has its place, but it is not on harbor and river craft. Like any other telegraph, the wireless needs an operator. That means that an extra man would have to be employed and placed in the pilot house, which, with what it already contains, is none too large. Moreover, if the terrible uncertainties of thick weather there is no time to wait for the translation of messages—the pilot has no time for second-hand communications.

As yet, the instruments of the wireless telephone are not synchronized, but neither are they in wireless telegraphy. Besides, the telephone for ferries and other harbor craft is not for social purposes; it is for exigencies. Secrecy is of no importance here. The steam whistle is not synchronized, but its sounds have been of incalculable service, notwithstanding.

Captains of tug, ferry and other boats point out many uses for the wireless telephone which one unfamiliar with the river and harbor service would never think of, and all are enthusiastic over its advent as a time saver, a money maker and a relief of the terrible responsibility for the precious lives entrusted to them in heavy weather.—Dr. T. Byard Collins in *Scientific American.*

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At Ottawa, Canada, the Bell is fighting a bill to give municipalities the right to refuse the use of their streets to telephone companies. Mr. Ritchie, counsel for the Bell company, says: "If the bill passes, the company can not carry on business till its rates are reduced. This looks like blackmail!" It would seem that this is rather a strong statement and just a little ridiculous.

# Is Telephone Competition in Canada Desirable?

It is an undisputed fact that the number of telephones in use in the Dominion of Canada is very small, if we take the best telephoned countries in the world as the standard of perfection. According to the latest statistics, Norway, Sweden and Denmark, have one telephone to every fourteen inhabitants, while the United States has one to every twenty inhabitants. Judged by these two standards, Canada should have, according to the first, 393,000 telephones, or to the second, 275,000, instead of the 63,192 recorded in the 1902 edition of the Statistical Year Book.

Statistics for 1901 place the proportion of telephones in the different provinces as follows:

Ontario, one telephone to 89 inhabitants.
Quebec, one telephone to 102 inhabitants.
Nova Scotia, one telephone to 122 inhabitants.
New Brunswick, one telephone to 129 inhabitants.
British Columbia, one telephone to 63 inhabitants.
Prince Edward Island and Manitoba not recorded.

It is significant that British Columbia, where the systems are operated by local companies, free from the influence of the Bell Telephone Company, has the best record, notwithstanding the fact that in commerce, manufacturing industries and financial resources, it is far behind the Eastern provinces.

Dealing with the territory served by the Bell Telephone Company of Canada, viz., the provinces of Ontario, Quebec, and Manitoba, a glance over the field will show that the sparsity of telephones is due, first, to the excessive rates charged in the cities and towns, and secondly, to the neglect to provide service except on prohibitive terms in the villages and rural districts.

An analysis of the "Bell" report for the year ending December 31, 1901, gives the following results:

| | |
|---|---|
| No. of telephones | 42,858 |
| No. of exchanges | 343 |
| No. of agencies | 514 |

Estimated number of telephones in 24 cities and towns, 32,000. Estimated number of telephones in remaining 319 exchanges and 514 agencies, 10,858.

If we deduct one telephone for each of the 514 agencies, there remain 10,344 telephones, or an average of less than 33 telephones for each of the 319 exchanges in the smaller towns and villages.

| | |
|---|---|
| Population of "Bell" territory | 4,035,416 |
| Population of twenty-four cities and towns | 900,000 |
| Population of territory containing 10,344 phones | 3,135,416 |

or one telephone to 303 inhabitants.

It will thus be seen that the small towns, villages and rural districts have hitherto been almost entirely left out of consideration by those to whom the duty of supplying telephonic facilities has been delegated, and this is emphasized by the fact that in some districts the people themselves have endeavored to provide their own service.

There is no doubt that the over-capitalization of the Bell Telephone Company of Canada is one of the chief causes of the high rates charged to telephone subscribers in the Dominion. It is on record that the American Telephone & Telegraph Company hold stock at par, value $1,928,900, out of the Canadian Bell capital of $5,000,000 allotted, it is generally understood, to the former company for the use of patent rights, long since expired. To pay 8 per cent on this $1,928,900, the sum of $154,312 has to be provided out of the rentals paid by the Canadian telephone users, or, in other words, an average tax of $3.60 per telephone has to be furnished over and above what is necessary to pay an 8 per cent dividend upon the actual capital outlay upon the plant.

Another reason for the excessive charges is the fact that the telephone has passed through several stages of development since the date of the original patents, and at each stage the apparatus in use became obsolete, rendering it necessary in the larger exchanges for the company to partially reconstruct their system and install improved plant. There being no adequate depreciation fund in existence to cover the cost of this reconstruction, and the company preferring that the subscribers should bear the burden, rather than the stockholders should have smaller dividends, the expenditure upon this work has been charged to capital account, thereby increasing the amount upon which dividends had to be earned, with the result that to-day the plant of the local systems could be duplicated for about one-third of the total capitalization and bond issues.

These facts prove beyond doubt that not only is there a present demand for a greatly increased supply of telephonic facilities, but that any independent company could give a modern telephone service at much lower rates, and earn satisfactory profits, because their capital outlay would be very much less than the amount upon which present telephone users have to pay dividends. This, however, is not all. We have now reached a stage in the history of the telephone when the manual system has a competitor in the automatic system, which will enable each subscriber to be his own operator, controlling his line while in use, ensuring him perfect secrecy, and rendering his conversations free from interruption. Already these systems are being installed on a large scale in Chicago, and Grand Rapids, Mich.; Columbus, Ohio; Dayton, Ohio; Portland, Maine, and other cities in the United States. In Canada, also, the Canadian Machine Telephone Company is installing a system in Ottawa and is preparing to enter the telephone field aggressively.

Further than this, a new system has recently been patented, which provides for the supply of electric light, power, telephone and telegraph facilities on the same circuit, thereby effecting a great reduction in the cost of construction and maintenance. This system is in actual operation, and so far as it has been tested is an undoubted success. If the same results can be obtained on a large system as have already been effected, and there is no reason to doubt it, this latest development will prove not only a source of great economy to electric light and telephone users; but it should be a most profitable investment for those who are fortunate enough to control it.

It is not possible in the limited space of this article to describe in detail these new developments of the telephonic art, nor would it be desirable to enter into a discussion of their respective merits. Suffice it to say that they are here, and it is for the public to note the fact and see to it that no binding contracts are made with existing companies, which would prevent them from participating in the benefits of these inventions for years to come.

The Bell Telephone Company's supporters will, no doubt, reply that, in the first place, the telephone is a natural monopoly, and therefore competition must fail, and in the second, that these new developments are mere experiments. In reply to the first statement, the results of the Independent telephone movement in the United States has increased the number of telephones in use from 600,000 in 1894, to over 4,000,000 at the close of 1902; while the fact that there have

been fewer failures in telephone companies than in national banks in the same period is sufficient proof of the financial success of competition.

In regard to the second statement, it may be said that experts in telephony, as competent as any the Bell Telephone Company have in their service, have pronounced these new systems to be of great practical commercial value.

The main question with the public, however, is whether competition in telephones tends to the advantage of the general community and the best proof of this is to be found in the history of the independent telephone movement in the United States.

In 1894, before the advent of competition in telephones, the Bell Telephone Company of America had less than 238,000 subscribers' stations, with a total output of 582,000 telephones, the result of nearly twenty years' undisputed possession of the field. On December 31, 1901, seven years later, the figures were:

Bell telephones ..... 1,020,647 stations.
Independent telephones ..... 1,250,000 stations.

Total ..... 2,270,647 stations.

The following are the figures for the states of Ohio, Michigan and Indiana:

Ohio—Bell telephones, 1894, 17,724; 1901, 79,500; Independent telephones, 1894, nil; 1901, 106,344; Farmers' telephones, 13,438.

Michigan—Bell telephones, 1894, 15,025; 1901, 48,930; Independent telephones, 1894, nil; 1901, 33,731; Farmers' telephones, 5,753. Michigan Bell Telephone Company in receiver's hands through cutting rates in their effort to kill competition.

Indiana—Beli telephones, 1894, 6,000; 1901, 35,000; Independent telephones, 1894, nil; 1901, 65,300; Farmers' telephones, 16,353.

The records of the other states show a similar increase since 1894, but space prevents the publication of the figures in detail. The following statement by a well known authority in the independent field will, however, convey some idea of the marvelous development:

"There are at the present time in operation in the United States over 5,000 Independent telephone exchanges. A further proof of the immense growth of the Independent telephone work can be found in the fact that the combined output of the Independent manufacturers during the year 1902, according to the report of sales, shows an average daily output during the entire year of 1,500 telephones, or practically 550,000 telephones for the year. These are figures which can be substantiated. If this is what was accomplished last year, it is not difficult to appreciate that the sales of preceding years would easily make up the difference required to give us an estimate total number of two and a half million telephones now in service."

"It seems almost beyond belief to the uninitiated, but a careful and conservative review of the financial affairs of the Independent telephone industry, covering a period of the last eight years, will show a most favorable condition. As heretofore stated, the percentage of failures among our national banks has been greater than in Independent telephone investments. And when one stops to consider that around the banks of this country is thrown a protective law, which should at least reduce to a minimum any question of failure, the claim of our common enemy that we are a lot of dreamers and that our work could not live is idle; and considering the $300,000,000 or more now invested in the Independent cause, we have from a financial standpoint the best of the argument. Verily the people have suffered long for a telephone service which might have been furnished by the Bell company years ago."

Dual telephone systems in the United States are not looked upon with disfavor, the effect of competition upon the rates being ample compensation for the inconvenience of two exchanges in one town. The table published herewith furnishes ample proof of the truth of this statement:

Sixty-seven cities and towns in the United States where telephone competition has not increased the cost to subscribers who are compelled to use both systems.

| PLACE | "Bell" Rates now busin's Phone | Independent Rates now Busi. Phone | Independent Rates now Res'd Phone | Total pres't cost of 3 P'es | "Bell" rates bef'e comp'n Busi. Phone | "Bell" rates bef'e comp'n Res'd Phone | Total cost of 2 phones before comp'd | ANNUAL SAVING |
|---|---|---|---|---|---|---|---|---|
| | $ | $ | $ | $ | $ | $ | $ | $ |
| Ottumwa, Ia...mostly free | | 24 | 12 | 36-up | 75 | 48 | 123 | 87-on most |
| Iowa City, Ia..... | 21 | 30 | 18 | 69 | 48 | 24 | 72 | 3 |
| Oskaloosa, Ia..... | 24 | 30 | 18 | 72 | 48 | 36 | 84 | 12 |
| Fairfield, Ia..... | 12 | 18 | 12 | 42 | 36 | 30 | 66 | 24 |
| Tipton, Ia ..... | 18 | 24 | 12 | 54 | 36 | 18 | 54 | Same cost |
| Hawkeye, Ia..... | 15 | 15 | 12 | 42 | 36 | 24 | 60 | 18 |
| Greenburg, Ia..... | 30 | 24 | 15 | 69 | 42 | 30 | 72 | 3 |
| Waterloo, Ia ..... | 30 | 30 | 18 | 78 | 50 | 36 | 86 | 8 |
| Decorah, Ia..... | 12 | 14 | 9 | 35 | 36 | 24 | 60 | 25 |
| Cheboygan, Mich.... | ? | 24 | 12 | 36-up | 30 | 18 | 48 | 12-on most |
| Benton Harbor..... | 12 | 25 | 16 | 53 | 48 | 36 | 84 | 31 |
| Adrian, Mich..... | ? | 24 | 12 | 36-up | 48 | 36 | 84 | 48-on most |
| Saginaw, " ..... / Bay City, " ..... / Flint, " ..... | 24 | 20-30 | 12-18 | 56-72 | 42-48 | 30-36 | 72-84 | 16-12 |
| Caro, " ..... | 24 | 20 | 12 | 56 | 48 | 24 | 72 | 16 |
| Holland, " ..... | 12 | 18 | 12 | 42 | 48 | 36 | 84 | 42 |
| Lansing, " ..... | 20 | 24 | 12 | 56 | 48 | 36 | 84 | 28 |
| Iron Mountain ..... | 12 | 24-36 | 18-24 | 54-72 | 48 | 36 | 84 | 30-12 |
| Chillicothe, O ..... | 42 | 24 | 18 | 84 | 48 | 36 | 84 | Same cost |
| Cleveland, O..... | 84 | 48 | 36 | 168 | 120 | 84 | 204 | 36 |
| Ashtabula, O..... | 6-up | 24 | 18 | 48-up | 48 | 36 | 84 | 36-on most |
| Mt. Vernon, O..... | 15 | 30 | 18 | 63 | 48 | 36 | 84 | 21 |
| Fostoria, O..... | 18-36 | 24 | 12-18 | 54-78 | 48 | 36 | 84 | 30-6 |
| Wellington, O..... | 24 | 24 | 12 | 60 | 36-48 | 24-36 | 60-84 | 0-24 |
| Zanesville, O..... | 12-42 | 33 | 18 | 63-93 | 60 | 36 | 96 | 33-3 |
| Shelby, Ohio ..... | 18 | 24 | 12 | 54 | 36 | 18 | 54 | Same cost |
| Barberton, O..... / Akron, O ..... / Cuyahoga Falls ... | 18-42 | 32-36 | 20-24 | 70-104 | 72-90 | 27-48 | 99-138 | 29-36 |
| Tippin, O..... | 24 | 24 | 12 | 60 | 48 | 36 | 84 | 24 |
| Mifflingburg ..... | 21 | 24 | 18 | 63 | 48 | 30 | 78 | 15 |
| Washington, O..... | 24 | 24 | 15 | 63 | 48 | 36 | 84 | 21 |
| Ravenna, O..... | 18 | 18 | 12 | 48 | 48 | 36 | 84 | 36 |
| Lima, O ..... | 24 | 30 | 18 | 72 | 48 | 36 | 84 | 12 |
| Sandusky, O..... | 48 | 30 | 18 | 96 | 72 | 48 | 120 | 24 |
| Kenton, O..... | 24 | 24 | 12 | 60 | 48 | 36 | 84 | 24 |
| Lancaster ..... | 24 | 24 | 12 | 60 | 48 | 24 | 72 | 12 |
| Cambridge ..... | 21 | 24 | 18 | 63 | 50 | 36 | 86 | 23 |
| Urbana, O..... | 24 | 24 | 12 | 60 | 60 | 36 | 96 | 36 |
| Cambridge, Pa..... | 12 | 18 | 12 | 42 | 24 | 18 | 42 | Same cost |
| York, Pa ..... | 15 | 30 | 18 | 63 | 60 | 48 | 108 | 45 |
| Johnstown, Pa ..... | 6-36 | 30 | 24 | 60-90 | 60 | 48 | 108 | 48-18 |
| Chambersburg, Pa... | 12 | 24 | 18 | 54 | 48 | 24 | 72 | 18 |
| Fall River, Mass ... | 90 | 36 | 24 | 150 | 125 | 48-up | 173-up | 23-up |
| New Bedford, Mass . | 48 | 36 | 24 | 108 | 96 | 48 | 144 | 36 |
| St. Paul, Minn .... / Minneapolis, Minn. | 24-72 | 48 | 30 | 102-150 | 120 | 66 | 186 | 84-36 |
| Winona, Minn..... | 12 | 30 | 18 | 60 | 48 | 36 | 84 | 24 |
| Duluth, Minn ..... | 0-54 | 30 | 20 | 50-104 | 54 | 54 | 108 | 58-4 |
| Beloit, Wis..... | 36 | 24 | 12 | 72 | 60 | 24 | 84 | 12 |
| Owensburg, Ky ..... | 42 | 30 | 18 | 90 | 60 | 36 | 96 | 6 |
| Louisville, Ky ..... | ? | 48 | 24-30 | 72-78up | 96 | 60 | 156 | 84 down'ds |
| Lynchburg, Va..... | 30 | 28 | 18 | 76 | 64 | 64 | 128 | 52 |
| Fayette, Ind..... | 12 | 30 | 18 | 60 | 60 | 36 | 96 | 36 |
| Bluffton, Ind ..... | 24 | 30 | 24 | 78 | 48 | 36 | 84 | 6 |
| Connersville..... | 18 | 24 | 15 | 57 | 42 | 30 | 72 | 15 |
| Wabash ..... | 18-36 | 24 | 18 | 60-78 | 42 | 36 | 78 | 18 Same cost |
| Columbus, Ind..... | 24 | 24 | 12 | 60 | 48 | 30 | 78 | 18 |
| Logansport ..... | 24 | 25 | 15 | 64 | 48 | 36 | 84 | 20 |
| Lebanon, Ind ..... | 24 | 21 | 15 | 60 | 48 | 36 | 84 | 20 |
| Michigan City..... | 12 | 17 | 15 | 54 | 48 | 36 | 84 | 30 |
| Tonawanda, N. Y ... | 30 | 36 | 16 | 82 | 60 | 40 | 100 | 18 |
| Auburn, N. Y ..... | 30-54 | 30 | 24 | 84-108 | 72 | 60 | 132 | 48-24 |
| Joplin, Mo..... | 24 | 24 | 18 | 66 | 72 | 54 | 126 | 60 |
| Trinidad, Col..... | 36 | 36 | 18 | 90 | 80 | 60 | 140 | 50 |
| Grand Rapids, Mich. | 30 | 30 | 20 | 80 | 50-48 | 40 | 90-88 | 10-12 |

This statement is made up from a total of seventy-one completed returns received from the Independent companies in the towns named.

In forty-five towns, two business telephones can be had for the same amount, or less, than was formerly charged by the "Bell" for one. In two towns the increased cost is only $1, and in one town $3 and in eight towns $6, one town $10, in three towns (including Cleveland) $12 and in one town $18.

There has further been a very marked improvement in the service given since the advent of competition, due to the fact that the increased demand for telephones has widened the field for inventors in the various branches of this art to an extent which would not have been possible during the continuance of the monopoly. It is also obvious that the Independent telephone companies have provided employment for many thousands of people who would otherwise have been forced into the ranks of other trades and professions, some of which are already overcrowded.

Taking all these facts into consideration, it is not to be wondered at that companies are now seeking to enter the field in Canada, in competition with the Bell Telephone Com-

pany, and it may here be stated that only by the encouragement of competition on a sound and legitimate basis can Canadians hope to end the existing unsatisfactory state of the telephone service in the Dominion.

As a matter of business between the people and the companies, let those of the latter who will provide the best service at the lowest cost be given every facility by the government and the municipalities to fulfill the requirements of the public. The benefits which have resulted from competition in all parts of the world are such that Canadians cannot afford to allow the telephone service to remain any longer in the undisputed control of a monopoly, which has proved itself to be unwilling to satisfy the reasonable requirements of the people.—F. Dagger in the Canadian Engineer.

# Independent Telephone Systems.*

By J. J. NATE.

FT. WAYNE:—The Home Telephone & Telegraph Company owns one of the most progressive plants in the Independent field, and it has been progressive from the date of its installation. The rapid growth of the home company's system compelled it a few years ago to install a second switchboard. How this could be done profitably at the rates obtained, if we are to accept as true the statements of the Bell company, is hard to understand. As a matter of fact, the Independent company began business in Ft. Wayne at rates very much below those secured by the Bell company, and its rapid growth has been shown elsewhere in this paper. It began business in 1896. Party lines are not used and the company has been able to pay satisfactory dividends since 1897. It occupies at present its own building in the central part of the city in which is installed a magnificent multiple switchboard with all necessary equipment. The capital stock is held by a large number of representative business men, and the bonds are selling above par. The fact that this company has been in successful operation for seven years is ample demonstration that the experimental stage has been passed. When the company made its last sale of treasury stock to take care of purchases and extensions, the amount was oversubscribed by 100 per cent in less than twenty-four hours by people who have been identified with the company since its organization.

GALESBURG:—The Galesburg Union Telephone Company offers another striking illustration of the success met with in the Independent field. In less than two years it has doubled the old Bell list, greatly reduced rates and is now furnishing service to upwards of 1,700 subscribers, with a waiting list of 100 more.

PITTSBURGH:—The Pittsburgh & Allegheny Telephone Company has met with a wonderful degree of success and is adding subscribers daily to an already large list. Some part of the work accomplished will be touched upon later.

TOPEKA:—This exchange has had its troubles and found itself at one time in deep water. That the tide is stemmed and a bright future is before the owners is made manifest in the following statement: A little over a year ago, the Bell company had in operation something over 1,200 telephones. The new company began service by asking rentals at the same rates. The situation to-day is: 1,200 Independent telephones in operation and 900 Bell instruments. Prices have not been cut. I understand that the city of Topeka and county of Shawnee have ordered all the Bell telephones out, and have installed Independent instruments in place thereof.

SAN ANTONIO:—Two years ago when this company began furnishing service the Bell company was operating between 1,700 and 1,800 telephones, of which the greater part were on party lines with two to six or even more parties to the line on grounded circuit. The charges were $5.00, $4.00, $3.00 and $2.50. The Bell company has at present but 1,500 telephones in operation, 900 of which are single lines, and the balance party lines. The present rates are from $5.00 down to $1.50. The San Antonio Independent Telephone Company commenced operation with about 800 telephones, and has now 2,200 instruments in service at rates much below those asked by the Bell company.

SEATTLE:—The installation of this plant was delayed somewhat, owing to unavoidable difficulties in getting material on the ground, construction of the exchange building, and similar causes. The Independent Telephone Company of Seattle is adding daily to its list of subscribers, the monthly increase running up into the hundreds. In addition to the original installation, this company has recently ordered 1,500 new instruments. It occupies its own property, and is practically a pioneer in the use of modern telephone apparatus on the Pacific coast.

Telephone subscribers in the West have not grown to realize the benefits derived through the installation of an Independent telephone plant. Along the Pacific coast the Bell company had for many years an open field in which to preach the idea that two telephone exchanges were detrimental. It remains for the West to learn, as we have in the East, that in nearly every instance, soon after the installation of an Independent telephone plant, it receives the undivided support of telephone users. At Seattle the service furnished by the Independent company is far superior to that which the Bell company's subscribers have known, and I understand that their company has established a system of color calls and numbers, whereas the Independent company has introduced a time-saving element in the use of more modern apparatus. It will be only a short time, in my opinion, until the list of Independent subscribers will exceed that of the Bell company.

PHILADELPHIA:—The work of completing an Independent plant in the second largest of our cities of necessity progresses slowly and yet the work of the company operating in Philadelphia has gone steadily forward. It has been increasing its plant, and new lines are reaching out in every direction. The demand for telephones has been growing constantly, and the company was recently compelled to order apparatus, telephones, etc., in order to equip several thousand additional subscribers' stations. The fact that the Independent movement is meeting with such pronounced success in Philadelphia presents a problem for the Bell company to consider. What is being performed in Philadelphia may be considered as a possibility in New York, while Chicago, as we know, is at the present time carrying forward all necessary work pertaining to the installation of an Independent system in that city.

JACKSONVILLE, FLA.:—The Home Telephone Company of Jacksonville further illustrates Independent determination and energy. Less than two years ago a large portion of Jacksonville was destroyed by fire. A complete destruction of the central office apparatus and many miles of its toll lines confronted the owners of this property, and it was a serious question as to what should be done. The issue

*This is the fourth of this series of articles by Mr. Nate.

was met promptly, however, and the company resumed operation just as soon as additional apparatus could be procured and installed and pole lines reconstructed. Since that time a multiple switchboard has been installed for the purpose of furnishing a more satisfactory service. I ask if this does not look as if Independent telephone people were pretty well satisfied with results in that part of the country.

JOHNSTOWN:—The home company began business in 1895, at which time the Bell company had possibly 100 telephones at $48.00 and $60.00 per year. The latter has less than 300 now, of which a great many are on the free list. These rates were practically cut in two by the Independents, who are operating at present about 1,800 telephones and furnishing free long distance service covering pretty nearly all of Cambria County. Just note the difference as to the service furnished: During all the years that the Bell company controlled the situation there were less than 200 subscribers, whereas the Independent company to-day supplies service to nearly 2,000 subscribers.

ROCKFORD, ILL.:—The Rockford Home Telephone Company's future and strength must be unquestioned when we consider the number of its neighboring towns and cities which are equipped with Independent apparatus. Subscription lists in every instance number more Independent than Bell telephones. Among the near-by towns and cities may be mentioned Janesville, Beloit, Madison, Monroe, Evansville, Platteville, Harvard, Freeport, Genoa, Rochelle, Mendota, Dixon, Aurora, Elgin and Racine, Wis., to say nothing of the many points in Iowa, which are all either in direct connection over Independent toll lines or will be in a very short time.

JOPLIN, MO.:—The Home Telephone Company of Joplin, controlling also several other properties, has developed that territory far beyond anything the Bell ever accomplished. In Macon there is no Bell competition. In Nevada the list of subscribers remains about as it was a year ago, the Bell having about fifty telephones and the Independent company about 450. In Carthage the Bell company is operating about seventy-five telephones; last July the Independent company were operating 700. Webb City and Carter have no Bell exchanges. Joplin has been in the midst of rebuilding, and the new plant is just getting into operation. The Bell has about 500 telephones, while the Independent company is furnishing service to 1,200 subscribers. This list has not been increased because of limited facilities. The company is at present preparing additional capacity in order to accommodate a large number of contracts on hand. In Nevada the Bell company charges a much lower rate. This, however, has not affected the business of the Independents.

KOKOMO:—The Citizens' Telephone Company may well be proud of its record. Originally and before the advent of the Independent movement there were but few telephones in service in Kokomo. The company operating there now and since two and a half years ago is furnishing service to over 2,000 subscribers, and by the first of July will have 2,500 lines in service. The company has not been able to build lines fast enough to care for new subscribers, and is at the present time over 200 behind. The Bell offers to furnish service at $1.00 per month for business and 50 cents per month for residence telephones. The Independents have continued at the regular rates at which they began service, and have not been affected by the cut on the part of the Bell company in any way. Th fact is the people subscribe for Bell telephones only when from some cause they find it impossible to get an Independent telephone installed.

YOUNGSTOWN, OHIO:—The following characteristic letter is printed in full:

"DEAR SIR: In answer to your letter of March 25th, would say the Youngstown Telephone Company is in quite a prosperous condition at the present time. We are operating something over two thousand three hundred telephones and are able at this time to take care of ourselves, besides laying up a very handsome surplus. We have something like seven hundred telephones more than the Bell in this territory, and although we have had our troubles the same as most other young companies starting out in life, we have finished creeping, and are now able to walk. We are adding new subscribers every day. Yours very truly,

"THE YOUNGSTOWN TELEPHONE COMPANY."

PARKERSBURG, W. VA.:—The West Virginia Western Telephone Company installed at this point several years ago one of the first common-battery multiple switchboards manufactured. The capacity estimated at that time in less than two years proved to be insufficient, and as a result this company has been obliged to purchase within the last few months an entirely new equipment. The earnings have been sufficient to enable the company to make this purchase without a hardship. The rates charged have been far below the Bell rates obtaining formerly and recently, just at a time when the Independent company found itself crowded and unable to take care of its subscribers. I understand the Bell rates were increased, and this action on the part of the Bell company brought about a feeling of indignation which resulted in a general stampede to the Independent company, and now everything is being done to add these subscribers to the exchange system as rapidly as possible. In fact, the work is fairly well completed at this writing.

LOGANSPORT, IND.:—I am in receipt of the following letter from the Logansport Telephone Company, which I quote in full:

"We have over one thousand five hundred subscribers in this city and one hundred rural subscribers. To the best of our knowledge the Bell company has not to exceed twenty-five telephones installed in the city and in reality is doing no local business. We also have in the neighborhood of one hundred and forty miles of first-class toll lines and therefore have the greater part of the toll business.

"We refer you to our city and county officials and to our business houses as to the class of service our company is giving.

"On April 1, 1902, when this company commenced giving service, the Bell company had about five hundred subscribers."

JACKSON, MICH.:—The Citizens' Telephone Company began service in November, 1902, with about 1,000 subscribers connected. The growth has been rapid and at the present time approximately 1,800 subscribers are on the list, with a number of unfilled contracts on hand. The growth of this company has been phenomenal, and it has recently placed orders for more than $12,000 worth of cable. The ultimate capacity of the switchboard is for 3,000 lines, and there is no question that with the beginning of summer 2,000 subscribers will be furnished service. Here, as nearly everywhere else in the telephone field, the Bell company has lost ground, and is losing daily. The service furnished I understand to be of the best.

JAMESTOWN, N. Y.:—The Home Telephone Company began operations in October, 1902. The Bell company at that time claimed to have about 1,000 subscribers. At present they have less than 700. The Independents are now furnishing service to nearly 1,500 subscribers, and are installing telephones at the rate of twenty-five per week. The rates demanded by the above companies are at the present time about the same. The Bell company, however, is understood to be offering free service. At this point the Bell company has been forced to replace its old equipment with new, but this movement has not been successful, and it has been unable to build up its list of subscribers. The Independent company ascribes its success to two factors: first, good service; second, public sentiment in favor of the new company.

ZANESVILLE, OHIO:—The Zanesville Telephone & Telegraph Company completed its plant about a year ago. The switchboard capacity at that time was 1,000, and is entirely filled. The company has been unable to increase that capacity, which has necessarily limited the growth. This will be done in the spring when the list is expected to go to approximately 2,000. This company has also developed the country pretty thoroughly around Zanesville, and has something like 130 farmers connected with the main exchange.

The service furnished is superior to that of the Bell company, and it might further be mentioned that rural communities never enjoyed the advantage of telephone service under the old Bell regime. In Roseville, a village of about 1,600, ten miles from Zanesville, the Bell company had an exchange of about thirty-five subscribers, and in Dresden, a village of the same population, sixteen miles from Zanesville, it has an equal number. Since the Independent company has constructed systems in these cities the service has been so much more satisfactory than that furnished by the Bell company that in Roseville there are 110 Independent telephone subscribers, while the Bell has none, and in Dresden the Independents have 100 subscribers, while the Bell has about twenty-five. The condition surrounding Zanesville as regards small exchanges is simply a duplicate of those which can be cited in connection with nearly all Independent points.

LIMA, OHIO:—The Lima Telephone and Telegraph Company was one of the early beginners and was quite unfortunate in its first efforts to build up its list and furnish a class of service consistent with the rapid growth of the exchange. All difficulties, however, have been surmounted, and to-day it is furnishing service to over 1,200 subscribers, with a waiting list of perhaps 200 names. Modern equipment was recently installed in order to facilitate the work of handling connections.

OTTUMWA, IOWA:—The following letter from Mr. Henry S. Herr, who has very actively interested himself in telephone matters and who has given the Independent situation careful study, is in regard to the local situation at Ottumwa:

"When this company commenced business here the Bell had somewhere in the neighborhood of three hundred telephones, and the Ottumwa Telephone Company contracts read that there should be no charge made for telephone service until three hundred subscribers were secured, which was in 1897. The company at present has nearly one thousand two hundred subscribers. The Bell company has about three hundred as near as we can learn. The business men here acknowledge the fact that they owe it to the Ottumwa Telephone Company that they have so large a list of subscribers with which they can do business, and the city's Commercial Association has recommended to the business men of Ottumwa a substantial increase in rates for the Ottumwa Telephone Company."

PADUCAH, KY.:—Speaking of the telephone situation in Kentucky, the Paducah Register editorially comments on the situation as follows:

"The telephone situation is just this: The people were given miserable service so long that they created a demand for another company. The demand continued to grow until certain capitalists saw fit to build an Independent telephone system. The people have gone upon the idea that the service to be given by the new company can be no worse than that given by the old company, with the chances largely in favor of an improved service. If it develops that the new company fails to give better service than that imposed upon the people of this city for the past ten years, we will now venture the assertion that there will be a strong demand for still another company. When the people of Paducah pay out their money for telephone service they at least have a right to expect what may be termed satisfactory service, and if the company that had a monopoly here for twenty years did not have enough business sagacity to install a first-class system or employ people who understood that the patrons were entitled to some consideration, they have but themselves to thank for the competition now before them. The argument that a firm must use both telephones is no better than to say that the advertiser must use all three of the papers. There are many houses in Paducah that take neither of the three papers, and there are hundreds who will not take either telephone. In the matter of telephones, the people will take just what they can afford or desire, and to a large extent will be governed by returns they get for their money both in the ways of connection and the service. There are hundreds of people who will take but one telephone, no matter how many may take both. The whole thing in a nutshell is, The best service for the money."

TEXARKANA, ARK.-TEX.:—When the Texarkana Telephone Company began its construction work the Southwestern Bell Telephone Company had about 500 subscribers. This list was increased during the construction of the Independent plant, after which it dropped back below the original number. The Independent company is furnishing service to about 700 subscribers, and expects that by the first of May it will have 1,000 lines connected. The service furnished is eminently satisfactory, which fact is made plain in letters at hand, two of which are quoted in full:

Texarkana, Ark., Tex., March 6th, 1903.

"I heartily agree with you, and were it not for the Independent company we should still have the same old service at high prices."—J. HUCKINS, JR."

"In reply to your favor of the 4th inst., I beg to say that the new telephones in use in this city are by far more efficient than those of the old system (Bell), which had been here for many years prior to the coming of the new company. The new telephones have been in operation here only a short while, and yet they are more used than the old. There is no comparison between the two systems either in the construction of the plants or in the service given the public.—ALLEN WINHAM, Mayor."

MANKATO, MINN:—The Mankato Citizens' Telephone Company is probably one of the most successful Independent plants in the Northwest. This company began service some years ago with perhaps less than 200 subscribers; today it is furnishing service to over 800 subscribers, and has recently installed a modern multiple switchboard and is operating a common-battery system. The old rate charged by the Bell company was $6.00 per month, but with the opening of competition this was reduced to $4.00. At present I believe it is asking $3.00 per month with a residence telephone free to the subscriber having a business telephone. Its present list of subscribers numbers probably about 300, including party lines, free telephones, toll stations, and telephones in use by employees and officers, and not forgetting the telephone in the poorhouse.

The Bell company originally was not furnishing night or Sunday service; the instruments, of course, were old-fashioned, and the local service abominable, both because of the quality of the apparatus and the independent attitude of the company. In a city of 12,000 inhabitants there was one telephone to about every 100 of its population. The installation of the Independent company completely destroyed the contention of the Bell company that it could not afford to give any better service; for it not only reduced its rates, but started in giving all-night and Sunday service. It has now a system which is up to date in every respect; but with all this it is not earning anything on the investment. The simple fact that there is in Mankato one telephone to every fifteen people as compared to one telephone to over 100 people four years ago is a remarkably strong argument in favor of Independent competition.

FOSTORIA, OHIO:—The Citizens' Telephone & Telegraph Company began operations here in 1895 with about 250 telephones in service. The Central Union (Bell) Company at that time had perhaps 150 subscribers, but this number was rapidly reduced because of the higher rates and the fact that the Independents were really furnishing a better service. When the fight first began the Central Union reduced rates to a ridiculously low figure. In 1898 the number of telephones in use by both companies was very nearly equal, and this after the rates had been reduced. To-day the Central Union has 250 telephones in operation, and the Independents are operating 875, with over 100 unfilled contracts on hand.

I wish briefly to call attention to the many large concerns that have grown from very modest beginnings to prominence. I refer now to the promoting and construction companies. This work has been managed by men of affairs in every instance, men who possess broad knowledge of the field, and who fearlessly undertook the task of forcing an issue with the Bell monopoly.

One of the strongest forces which Independent promoters have had to contend with has been political opposition. This influence the Bell has ever exerted, showing strength in this direction hard to overcome; but the determined effort and confidence exhibited by the Independent promoter and exchange owner has won the battles. The people of the United States did not know under the old Bell management at high rentals what telephone service meant. It remained for the Independents to construct immense systems of toll

lines and install large and prosperous exchanges furnishing improved service, going out into small towns and communities where telephones had never been seen, and establishing exchanges at moderate rates, to demonstrate the future which is with us to-day.

In concluding this series of papers a few quotations from a letter issued by John I. Sabin shortly after his election as President of the Central Union Telephone Company, are quite pertinent. After suggesting several ways in which to raise money, Mr. Sabin says, in effect, that the measures he proposes are necessary, in order to preserve the company from "dry rot." He does not gloss over facts in the least, and goes near to saying that the company is in extremely bad shape, without saying it in so many words: "There is no use crying over spilled milk or abusing one another for things not accomplished. The people of the states of Illinois, Indiana, Ohio and Iowa want telephone service. Will you supply it, or must some one else? Are you doing it with fewer than 70,000 stations? No. When you have 300,000 exchange stations, then you have a good start, not before. With your present 70,000 stations, a great majority of them at insufficient rates, thousands of them absolutely without charge, you cannot build up anything except opposition. Again, what you want done must be done now. Later on, and a little later on, at that, it will be *too late.*" And it is too late. The 300,000 stations that Mr. Sabin sought for the Bell company in his efforts to procure many millions of money are to-day being furnished by the Independent telephone companies. This statement is further strengthened by a few quotations from a paper read by Mr. S. P. Sheerin in Buffalo about the same time that Mr. Sabin urged the stockholders of the Central Union Company to advance five millions.

Speaking of the work that the Independents have done in the Central Union Telephone Company's territory, touching upon its financial condition and the opposition overcome in the advancement of the Independent work, Mr. Sheerin says: "Now let me tell you what all this has resulted in. The Central Union company has, as shown by their own figures, 22,000 telephones in the state of Indiana (the real number is smaller than this, but we can afford to be generous) and I propose to give them all they claim. The Independent telephone interests have in the state of Indiana, by actual count, 52,469 telephones. The total population of Indiana, according to the census of 1900, was 2,516,000. There are 92 counties in the state, and there are 27 of these in which neither the Central Union nor any other Bell company has an exchange, large or small. The population of these 27 counties aggregate 491,000, and the aggregate number of Independent telephones in these 27 counties is 14,262. The total number of Central Union and other Bell telephones, used at toll stations only in these 27 counties, is 197."

While the Independent telephone field has been largely developed inland, it is apparent that the field is not restricted, and the coming two years will see the movement a success from the Atlantic to the Pacific and from Nova Scotia to the Gulf of Mexico. The same energy and common sense which have been the predominating factors in the Independent movement thus far will win for it recognition everywhere, no matter though the Bell company is strongly intrenched on old Atlantic's shore. There are thousands to be supplied with telephone service who cannot afford it at monopoly rates, and, moreover, the manufacturing interests throughout New England demand and will receive in due time recognition of their rights in an efficient telephone service at honest rates. This means the building up of the Independent work in that wealthy and densely populated section of our country. As on the Pacific slope, the movement has been necessarily somewhat retarded; but, as shown in this paper elsewhere, there has come an awakening, and the gentlemen who have fought the telephone interests for the Bell company will now have a fight in their home territory, and will not have time to devote their attention to what is being done in Indiana, Ohio and distant states. Fortunately for the masses, Independent telephone companies are not called upon to pay arbitrary prices for the apparatus they buy; they are not compelled to submit to the appointment of presidents and general managers at salaries equaling that of the President of the United States, and therefore are in position to give the user of telephones high-class service at honest rates. It is possible that in the final adjustment of this great telephone question the Bell company may wake up to a realizing sense of the weakness of its position, meet the Independents half way and so avoid useless expenditures of large sums of money on the part of both interests, at the same time giving the people a service to which they are entitled and at reasonable rates. If this is not the solution of the problem before us, then I urge every individual stockholder of any Independent telephone property of whatsoever character to put his shoulder to the wheel, fight the enemy, and oust from his own camp that element which is ever ready to sacrifice the interests of fellow-men to its own selfish ends.

## FLORIDA INDEPENDENTS FORM ASSOCIATION.

At a meeting of representatives of all of the Independent telephone lines of Florida at the office of the Jacksonville Telephone Company May 26 a permanent organization was formed, with the object in view of bettering the facilities and conditions of all the Independent exchanges in the state.

There were present at this meeting W. N. Shine, Jacksonville Telephone Company; W. G. Brown and H. G. Hare, Peninsular Telephone Company, Tampa, Bartow, Braidentown, Palmetto and adjacent points; F. A. Sands, superintendent Ocala Telephone Company; W. B. Mitchell, Sanford Telephone Company; T. B. Livingston, Live Oak; Ed Scott, Arcadia and Orlando. Those represented by letter and proxy were W. G. Rowe, Starke; Henry Jennings, Indian River Telephone Company; E. A. White, De Soto Telephone Company; H. H. Willington, Apopka; M. N. Drew, Madison; W. H. Milton, Marianna.

The name of the association will be the Independent Telephone Association of Florida. The officers are W. G. Brorein of Tampa, president; W. N. Shine of Jacksonville, vice-president; W. B. Mitchell of Sanford, secretary.

At this meeting the telephone situation was generally discussed. One of the main features of the business under discussion was the long-distance service, and there was an expression of opinion favoring a connection of all the Independent lines in the state.

Another important matter was the selection of a standard system of equipment and construction. This is essential to the connecting of all the lines, and if the plan is adopted the connection of the Independent lines of the state could be effected with but little trouble.

The Independent telephone exchanges in Florida are located in the following towns: Marianna, Quincy, Tallahassee, Monticello, Madison, Live Oak, Jasper, Lake City, Jacksonville, Palatka, Ocala, Leesburg, De Land, Sanford, Orlando, Kissimmee Apopka, Lakeland, Bartow, Braidentown, Tampa, Palmetto, Plant City, Arcadia Punta Gorda and Fort Myers. In the Southern part of the state nearly all of the exchanges are connected, and arrangements are being made to get them connected in other parts of the state.

The composite circuit on the Illinois Central railroad from Louisville to New Orleans has been completed and telephoning and telegraphing are carried on over the same wires. Work was begun several weeks ago, and the system is now one of the most complete in the country.

# Balance on Telephone Lines*

Telephone lines are never absolutely silent. On lines of a certain length, sounds of very diverse nature and origin may be heard. In most cases these sounds are too light to hinder conversation, and are not even perceptible by the speakers when their attention is occupied in grasping the sense of the words they are exchanging. They are only noticed when greatly increased in intensity. Then it is said that there is "frying" on the line, an expression which has passed into the current speech, and by which are designated, without a great deal of precision, all the sounds extraneous to conversation. If you ask technical people what is the cause of this disturbance, they will answer you, and with reason, that there is some disorder or derangement on the line; but if, pushing curiosity still further, you wish to have explained to you the cause of this feeble frying which constitutes the light and confused murmurs heard on circuits in good working order you will probably receive the following answer: "The line is not absolutely balanced; it could be entirely silent only if one should attain to perfect balance in construction, an ideal condition which is never fulfilled in practice, and, on account of certain inevitable irregularities, cannot be fulfilled."

We propose in this article to inquire into what should compose this balance, which every one agrees in considering necessary, but as to the nature of which opinions are so divergent. In order to study this question methodically we shall commence with the lines which, in the unanimous opinion of technical men, have an imperfect action—namely: grounded circuits. In seeking to take account of their imperfections we shall be led to ask ourselves if the better constructed metallic lines are not, although in a much less degree, subject to the same accidents. Then, knowing better the causes of these noises, it will perhaps be possible for us to see if it is really necessary that the lines possess a balance and in what that balance should consist. We may then hope, and it is an encouraging outlook, that this study will bring us to see the conditions which a circuit should present in order to work in a satisfactory manner.

Grounded lines have two points of inferiority to lines entirely metallic. These relate to the impossibility of assuring them a good insulation and of protecting them from induction of neighboring wires. We shall examine each of these points separately.

It would seem superfluous to speak of the insulation of a line which has both its ends in the earth, especially if one understands insulation in the sense in which it is conventionally used in telephony—that is, the suppression of all communication with the electromotive forces foreign to that generated by the apparatus intended to transmit the voice. The line connected to ground at its two extremities is in contact with points of which the potential, with rare exceptions, will be different; a current will be established, and a sound will be heard in the receiver. This condition will be generally realized if the line is short, for then the potential will be continually variable at its two extremeties. It may be that sometimes it will vary in the same manner at these two points at once.

Grounded lines were long apparently satisfactory for local exchanges, full metallic circuits being employed only for toll lines; but the development of electrical industries, and especially the installation of numerous electric railways, has rendered their use impossible. They have been abandoned in France, and have been retained abroad only in some cities in which the public, less exacting than our own subscribers, are contented with service far from perfect. On grounded circuits may be noticed a great number of noises which might be classed as follows: A confused sound, accompanied by a crackling like that of boiling oil, this noise arising from variations of tension produced in the earth by diverse causes to which the earth currents may be attributed; telegraphic installations near the telephone disturb part of the working current, which disturbance is easily distinguishable with a little practice; electric tramways give very well defined musical sounds corresponding to the starting of cars, to variations of speed, to vibrations due to the rolling of the trolley wheel along the supply wire, and, finally, from electric lighting plants, which make no use of the earth, one seldom perceives any noise, except in case the insulation of the distributing wires is defective.

We have just seen how rare are the cases in which grounded lines can furnish good service, on account of the foreign currents which, agitating the receiver diaphragms, interfere gravely with conversations by the interposition of sounds which sometimes render them unintelligible. But, even supposing that we enjoy exceptional conditions, far from any other electrical installation, may we hope that the grounded line will give entire satisfaction? No, for it will suffice that it encounter along its course another line, either telegraphic or telephonic, for it to become the seat of phenomena of induction, which will bring to the ear the messages being transmitted on this line, and this will present at least two difficulties: the secrecy of communication will not be safeguarded, and there will be trouble for both in communicating at all.

Without insisting further it would seem sufficiently established that grounded lines can furnish only a very defective service, and that they can be employed only in exceptional circumstances. Nevertheless, they are used in many places abroad. We can explain this to ourselves only by supposing that in these countries the patrons have a conception of the telephone different from ours, not regarding it as a sure and secret instrument of communication, but as a precious aid to commerce and industry, in which is desired the quality of cheapness rather than that of perfect service.

To return to the object which we are pursuing in this article, we are compelled to ask ourselves if it is a question of balance. The troubles described come from two causes—the disturbances introduced by the earth plates, and the induction of neighboring wires. No means presents itself to the mind, and none has been proposed, for combatting the effect of induction. For the other disturbances, we have seen that they are not active when the given points in the earth are of the same potential. One might then apply the idea of balance to the earth plates, and say that the action of the line will be good when these are balanced. We believe it is more rational to conclude that generally the grounded line has no sort of balance whatever, but that its poor quality should be attributed to considerations which have not even the most remote connection with the idea of balance.

In order to avoid the difficulties just described, there has been a tendency, since the beginning of telephony, in favor of metallic circuits. They have been used solely for toll lines, grounded lines being limited exclusively to local exchanges. They show at once an incontestible superiority. Not having direct contact with the earth, they are able to act between the most distant points without being affected

*Translated for TELEPHONY from L'Electricien, Paris.

by the variations of potential which, from causes the most diverse, are active at the surface of the earth. For supporting ærial wires double-cup insulators have been adopted, which insures a good insulation of the line, sufficing, even in damp weather, to avoid the influence of currents arising from the earth or from near-by electrical installations. Moreover, to combat the induction of neighboring wires, various special apparatus has been invented which, though different in form, all rest upon the same principle. Not being able to avoid induction it is sought to render its effects equal on each wire, so that the currents shall neutralize each other.

The line having two wires, it may be seen how the idea of balance could arise, and it is natural to think of making these two wires play identical rôles. As to that, they should be—with regard to the telephonic current they are destined to carry, as well as with regard to the neighboring lines whose influence they are supposed to maintain in equilibrium —to a certain extent in a state of balance; and it must be supposed that upon the perfection with which this balance is realized will depend the success of conversation over the wires.

Let us resume from this point of view the study of insulation and induction, examining if it will be possible to protect two-wire lines from the troubles of which we have ascertained the presence upon lines consisting of a single wire.

When it is considered that the intensity of telephonic currents is excessively feeble, that a fraction of a micro-ampere will suffice to operate the receiver, one may ask himself if it will ever be possible to give the lines an insulation that will protect them from currents derived from neighboring electrical installations. Let us take, for example, a telegraph line placed upon the same supports as a telephone line. The tension of the telegraphic current will be generally about 100 volts. If we wish to be sure that there will not be a leakage of a current of one micro-ampere, it will be necessary that at any point the mutual insulation of the two lines be more than 100 megohms. If we are near an electric railway, we know that the earth is electrified and that its tension attains to some volts. It may be admitted, without exaggeration, that this tension will be five volts. It will be necessary then that the telephone line have at no point an insulation of less than five megohms. This condition will be found fulfilled if the first has been. One hundred megomhs not being the total insulation, but that of a given point, it may be hoped that it will be practically possible to attain it, and, indeed, in damp or even rainy weather it has not been found that the telephone lines are more influenced than in dry weather. This tends to prove that sufficient insulation may be realized. It may be objected that the total insulation is far inferior to that which is necessary to prevent a current of one micro-ampere from penetrating the telephone line. This is true enough; but it is proper to remark that if the line is well constructed, its insulation will be the same from one end to the other; there will be at each point of support a slight leakage, but these leakages, if they are uniform distances apart, will act in the same manner as induction currents—will be neutralized by equal currents in the telephonic apparatus. In fine, we see that for insulation a certain balance is necessary; it is necessary that each of the wires have, with regard to the neighboring conductors which may influence them, a sufficient insulation, and that this insulation be very uniform.

It should be added that this balance is jeopardized by accidents which it is very difficult to avoid: an insulator broken or merely cracked, a branch of a tree in contact with a wire, any foreign body—end of a string—thrown upon the line, will suffice to put the system at fault and to make a weak point. Telephone lines which follow for a few metres an electric railway are often disturbed by this inconvenient neighbor. So we have avoided as often as possible, in France, the placing of important telephone circuits in proximity to industrial installations. The telegraph has never been considered so dangerous. Its currents produce sounds less troublesome; but it must be confessed that with our telephone lines it certainly would be better if we could place them on special lines, where they would have nothing to fear from the disturbing influence of telegraphic currents.

Telephone lines are usually placed upon the same supports as telegraph lines; currents are induced upon the telephone wires, and it is only necessary to attach a receiver along the line to ascertain that these currents are not of a nature to be easily overlooked. The principle relied on to combat induction and to realize what is now called "anti-induction" is as follows: It is admitted that each wire composing the circuit undergoes induction separately, and it is sought to render the currents induced upon it equal, so that being equal at points situated opposite each other, they may still be so at the ends of the line, and thus create an equilibrium. It is according to this conception of induction and the means of counteracting it that most lines thus far have been constructed.

For making the currents equal upon each of the wires, the means which naturally comes to mind is to place the two wires of the same circuit at equal distance from the source of induction. This condition is nearly impossible to realize, because the lines cannot be perfectly regular along their entire length, and because there are usually several wires which are sources of induction placed at different points on the supports. Then there is the transposing of the wires at equal intervals—"crossing" them, as this operation is called in practice—so that along its whole length each wire occupies the same position with regard to the sources of induction as that with which it is associated.

There will be equilibrium along the entire line, in a very general way:

(a) If the intensity of the inducing current remains constant;

(b) If the distances which separate the points of transposition are equal;

(c) If the entire section is divided into an even number of elementary sections.

This mode of conceiving anti-induction requires that the wires be of the same metal and have the same diameter, without which the induced currents upon each one will not be equal.

We have then an idea of balance which is easy to define. The line should be composed of two wires of the same metal, equal in diameter; the wires should be transposed—"crossed," to follow the hallowed expression—at equal intervals, in order to bring them into identical conditions with regard to the foreign currents which are capable of influencing them. Finally, as has been established in the preceding paragraph, they must present an insulation as great as may be, and above all very regular, very uniform along the whole length of the line.

These are the things that make balance as it is generally understood. So far, construction has been in accordance with these principles, and has given satisfaction. Does it then follow conclusively that the conditions which have been fulfilled and which are recognized as sufficient are necessary? We do not think so, and this it is which remains for us to explain.

The theory that we have given of anti-induction supposes that each wire of a circuit undergoes induction separately. This is the idea of the double-wire line which naturally arose when they first began to be used. Concerning the action of lines, the new theories which have been invented since then, on the contrary, have a tendency to consider the mutual self-induction of the two conductors; the line is no longer supposed to consist of two separate wires, but of two wires strictly bound together along their whole course, and it seems that there is reason for harmonizing our ideas

(Concluded in August.)

M. Adrian King of Los Angeles recently made a trip to Eastern points.

F. C. Smith, manager of the Citizens' Telephone Company of Houston, Texas, is in New York on business.

Samuel Mankowitz, president of the Monarch Electric and Wire Company, Chicago, is preparing for an extended outing trip.

Wm. Rolland of Chicago is superintending the construction of the new Independent Telephone Company's plant at Ann Arbor, Mich.

Arthur O. Einstein has accepted a position with the Electric Appliance Company, Chicago, as traveling representative for the state of Illinois.

J. H. McAndrews of Cedar Rapids, Iowa, has removed to Van Horne, where he will assume charge of the Vinton and Benton County Telephone Company.

Walter Cook, switchboard expert of Toledo, Ohio, is in Utica, N. Y., and will overhaul the inside equipment of a number of telephone plants near that city.

Joe W. Fulmer and Miss Edith Webber were married at Florence, Wis., June 17, and will be at home August 1, corner Wilson and Lyman avenues, Ravenswood, Ill.

Former Senator Henry H. Persons has been elected vice-president of the Frontier Telephone Company of Buffalo, and has assumed active control as general manager.

C. H. Judson, general superintendent of the Twin City Telephone Company, resigned from the company July 1 to become general manager of the Home Telephone Company of Kansas City.

N. C. Griffith, local manager for the Delaware and Madison Counties Telephone Company at Alexandria, Ind., has resigned, and gone to Burlington, Iowa, where he will have charge of construction work.

S. F. Leavolt, formerly of the Home Telephone Company, Ottawa, Ill., has removed to Watseka, Ill., where he will be prominent in the new Independent telephone movement that seems in a fair way to sweep away all opposition in Iroquois county.

A. G. Hawley, formerly of Lockport, Ill., has removed to Clinton, Ia., where he is president of the Tri-City Telephone Company operating in Clinton and Lyons, Ia., and Fulton, Ill. Mr. Hawley has been active in the telephone field since 1899.

Edward Glandon of Pittsfield, Ill., has been at Hannibal, Mo., recently, perfecting arrangements whereby the Pike County Telephone Company will cable across the Mississippi river to connect with the lines of the Bluff City Telephone Company.

C. E. Kent, who is well known in telephone circles, having been identified with some of the larger Bell and Independent companies, is just completing the work on a new multiple cable distribution for the addition to the Cambridge (Ohio) Telephone Company's plant.

Hon. W. J. Vesey of Fort Wayne, Ind., was a recent Chicago visitor. Mr. Vesey is secretary and treasurer of the Electrical Investment Company, controlling the telephone systems at South Bend and Logansport. It is the purpose of this company to engage largely in the building of toll lines.

F. A. Focke, engineer for the Federal Telephone Company, has resigned his position with that company and accepted a position with L. W. Stanton, Cleveland, consulting and contracting engineer. Mr. Stanton has contracts for building and rebuilding, and equipping a number of exchanges throughout the country. Mr. Focke's technical training, together with his practical experience in telephone engineering, makes him a valuable man for assisting in the multiple cable distribution and construction, of which Mr. Stanton is making a specialty.

A. S. Foote of the Southern Pacific Railroad has contracted with the Stromberg-Carlson Telephone Manufacturing Company of Chicago, Ill., and Rochester, N. Y., for equipment to be used on the division from El Paso to New Orleans. Mr. Foote is stringing copper circuits between cities, and from stations to sections he uses grounded circuits. This places section, engine and work crews at the disposal of the dispatcher. It is also proposed to place at every blind siding some kind of a telephone or apparatus that will enable wrecking crews to communicate with the dispatches.

L. W. Stanton, consulting and constructing telephone engineer, Cleveland, Ohio, reports that he is working on a number of new installations. Mr. Stanton is making a specialty of multiple cable distribution and construction. Experts contend this method is more economical in maintenance, and for future additions less expensive than any other known system of cable distribution. In party line work it is said to be the only system in which the full value of party line rate is realized. In this system the use of bare wire and cross-arms is eliminated. Subscribers are connected with the cable by use of an ingenious terminal, each pair of wires being available for this connection in several places. By practically abandoning the use of cross-arms and bare wire, depreciation is very materially reduced and crosses and grounds due to wind and sleet storms are eliminated.

## IT CAN'T MAKE EXTENSIONS.

The Missouri and Kansas (Bell) Telephone Company will get no more permits for poles to be located in the limits of Kansas City. At least none will be granted for the present, or until the company has patched up its differences with the city administration.

The board of public works has not granted permits to this company for several weeks. One reason was that the permits had not come to the board for granting. They had not passed the city engineer and the city electrician, whose approval is necessary before the board will consider them. The Home Telephone Company has been receiving a large number of pole permits every day the board holds a meeting.

Up to about two months ago the Missouri and Kansas Telephone Company had occasionally received permits. Then the difficulties began. The order was given that the city engineer and then the city electrician should "O K" the requests for permits before they were acted on by the board. After that the board did not see any permits, except for the Home Telephone Company.

Six weeks ago some people on Forest avenue, who wanted telephones in their houses, tried to find out why the company did not install them. They discovered that the company could not get permits to erect the poles. The board had not been asked to grant the permits and instructed its secretary to locate the requests for the permits, if they existed. He directed an inquiry to the city engineer. Mr. Pike replied that possibly the city electrician knew something about them.

B. E. Haldeman, city electrician, in response to an inquiry, said that the mayor and city counselor had ordered the permits held up. Mr. King wrote to the city counselor as follows:

Please note attached complaints and correspondence regarding proposed poleline of the Missouri and Kansas Telephone Company on Forest avenue from Thirty-fourth street to Armour boulevard. It seems that this permit is being held up, and we would like to know if there is any reason for this delay that we can make known to the parties in that neighborhood who are clamoring for telephones. Please let us hear from you as soon as possible.

The board, through its secretary, R. E. King, received the following communication from R. J. Ingraham, city counselor:

Answering your favor of May 9 in regard to the proposed poleline for the Missouri and Kansas Telephone Company on Forest avenue from Thirty-fourth street to Armour boulevard, I beg to say that in my opinion the city is justified in law, and from the facts relaitve to the telephone controversy, to decline to grant permits to the Missouri and Kansas Telephone Company anywhere within the limits of Kansas City, Mo.

The evidence in the telephone case reveals that this company has not justly and truthfully made its returns of the amount of conduit it had in the city. It practically declines to give the city any telephone service over instruments in the city hall; that is, it refuses to put in modern instruments unless the city signs a contract which practically places the city and the people at the mercy of the telephone company. Moreover, by false returns, it has escaped, and is escaping, taxation upon its property within the city limits. In the telephone case it made a showing that the physical property within the limits of the city is worth over a million dollars. And yet its returns to the state board of equalization show only a very small fraction of such a valuation.

Therefore, in view of the state law passed by the last legislature, making it necessary for telephone companies to procure consents from the municipalities before erecting poles, the city is in a position where it can (it may, or it may not, as it sees fit) grant permits to this company.

For the reason above stated, and the further reason that this company has refused to obey municipal regulations, has denied the right of the city to regulate, and, in short, has defied the city in every way, and has shamefully imposed upon the people of the city in giving them a very poor service over antiquated and wornout switchboards, there is absolutely no reason why the city should grant any further favors, concessions or rights to this company. For these reasons I should recommend as the opinion of the legal department that no more pole permits should be granted to the Missouri and Kansas Telephone Company.

## A DESIRABLE INNOVATION.

Possibly a great many people have reflected upon the curious circumstance that United States post offices rarely have that modern, time saving invention, the telephone. Many a man has doubtless wished to call up the post office upon some matter of business, but has never been able to do so. It means a trip to the office or a wait for the postman.

There are many legitimate questions which might be asked of a post office over a telephone. There are probably two reasons why the instruments are not installed. The first of these is that Uncle Sam makes no provision for payment for the service; and, second, postoffice officials do not care to be bothered and are in a position to be independent. Nevertheless telephones have proved useful and serviceable in a number of offices throughout the country, and the department has recently set the seal of its approval upon them.

The first assistant postmaster general has answered a query in the following language:

There is no objection, if the postmaster is sure that the person making such inquiry has authority to get the information asked for. A postmaster answers such an inquiry on his own responsibility, and therefore should exercise discretion. I appreciate the conditons, and can see the great benefits farmers derive through being able to communicate with the postmasters by telephone. The department has no desire to interpose an objection.

It would seem as though the government ought to be willing to install telephones in the larger offices in order that the public might take advantage of this greatly needed convenience.

## PROMINENT EXCHANGE MANAGERS

F. A. Demarest, general manager of the Interstate Telephone Company of Trenton, N. J., is a man whose success might have been predicted long ago with a reasonable certainty of the prophecy being fulfilled. Naturally gifted with rare executive ability, he has also enjoyed precisely that training best calculated to prepare one of his talents for the position he now occupies. He is an expert electrical engineer of long experience, and has a thorough knowledge of the mechanical and scientic aspects of telephony. Mr. Demarest began his career, as did many others who have since become prominent in the Independent field, as an employe of the Bell company, working as a lineman. Beginning at

F. A. DEMAREST.

the bottom and rising to prominence, he is a thoroughly practical telephone man. On the other hand, he has been prominently identified with the management of some of the most important telephone companies of the East, and few, if any, are more intimately conversant with all phases of Independent policy.

Under the direction of Mr. Demarest the Interstate Company, although less than two years old, has extended its field until it will soon be able to list a hundred cities and towns to which it furnishes service. He has shown himself to be the man for the place, and enjoys the confidence and esteem of his company and of its patrons.

Near the Columbia river bridge of the Northern Pacific railway what is said to be the longest span of wire but one in the world was stretched a short time ago. It is a telephone wire and the distance from pole to pole is 2,800 feet.

# The Science of Heating and Ventilating Telephone Exchanges

By GEORGE MUIR

The science of heating and ventilating has attained a degree of perfection that forces managers of telephone exchanges to take it into account. The crude notions on the subject that obtained even a half dozen years ago were all about equally unimportant; but nowadays there are sys-

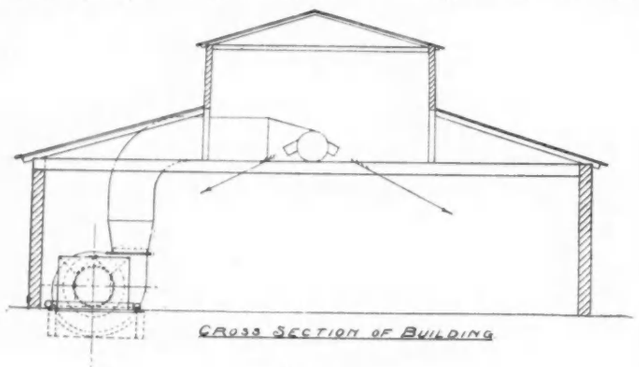



FIG. 1.

tems and systems, and their various degrees of merit require study and discrimination.

One thing that distinguishes the older from the modern systems is that the latter take account of that disturbing

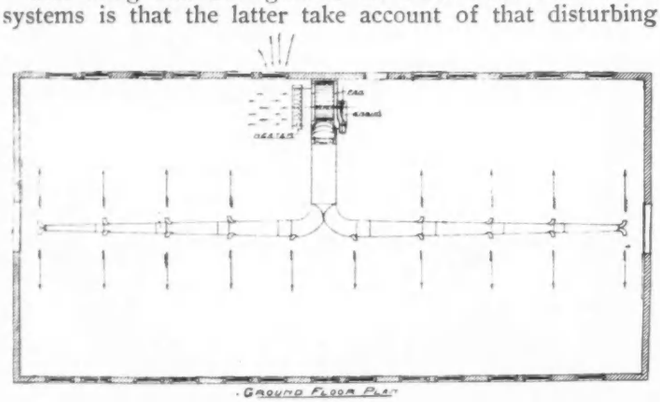



FIG. 2.

element, dust. One of the most vexing inconveniences a telephone company has to deal with is the settling of dust on the exposed contacts in the different parts of the switchboard. Trouble always results, such as crosses and bad

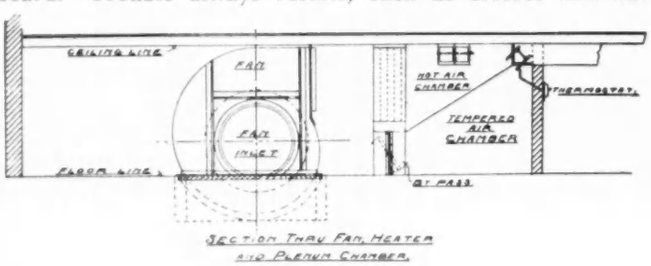



FIG. 3.

connections. So a system of heating and ventilation capable of obviating this nuisance is important.

Besides the foregoing, telephone companies have an interest in the general considerations which apply to all establishments where people work indoors. Better ventilation means more and better service from employes.

Heating systems may be divided into three classes, as follows:

1. Heating by direct ventilation. This is the system of radiators or of steam or hot-water pipes.

2. Indirect systems. This system consists of heating

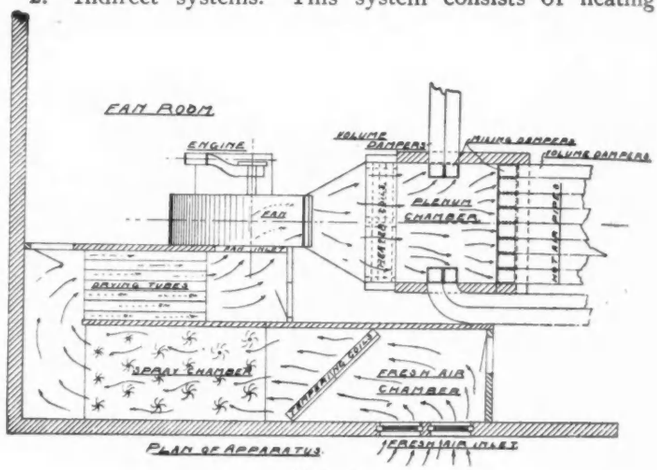



FIG. 4.

outside air introduced for the purpose over steam or hot-water pipes or radiators. In severely cold weather, however, the pipes or radiators are liable to be frozen by the outside air, and, consequently, this system is not much used.

3. Circulation of heated air by the use of fans. This is done by two methods, namely, a draw-through apparatus

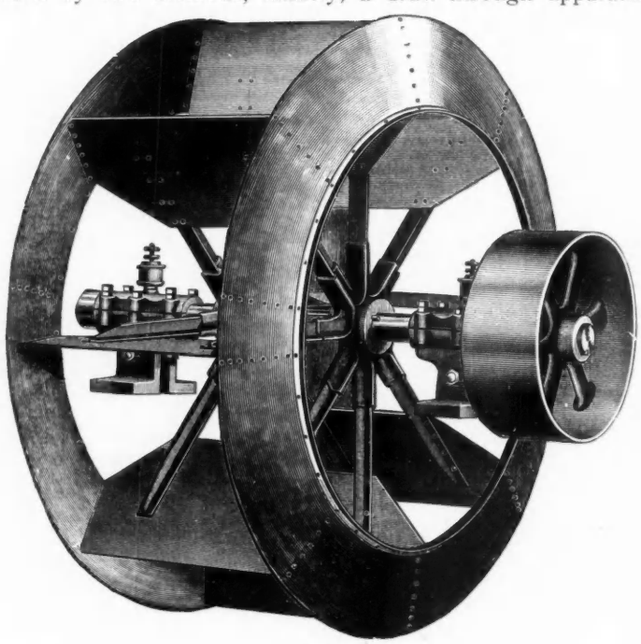


FIG. 5.

and a blow-through apparatus, as per illustrations. The former apparatus is used in buildings where enough fresh air is admitted around the windows and doors to provide good circulation, the fan taking its air supply from the inside, thereby causing a vacuum, which, of course, causes an in-rush of air at the above mentioned openings. This air

is then distributed to the different parts of the buildings by galvanized iron or underground ducts.

In direct systems of heating there is required a large amount of pipe to carry the steam to the different parts of the building where radiators are located. This piping, with the radiators, valves and special fittings required, make the first cost of the system very high. The cost of maintaining it is also great, as these fittings and valves have to be replaced from time to time.

In indirect systems of heating, there is required about one-third as much steam pipe as in the above-mentioned systems, and the pipe all being located in the basement with the boilers, it is not exposed to the frost, and, being located near the engineer, it requires no special steam fitter to be constantly looking after it. Moreover, the fuel consumption is less in indirect systems than in direct systems.

In Fig. 3, which shows one manner of distributing air, it will be observed that there is no fresh air taken in from any special fresh air inlet, but that the inside air is returned to the fan and again distributed throughout the building.

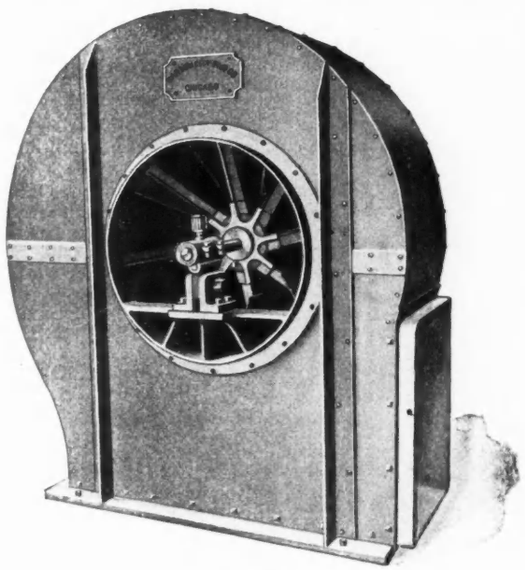


FIG. 6.

Thus most of the air is reheated, enough fresh air coming in through the doors and windows to keep the supply fresh.

In Fig. 4, which shows the ideal system of heating and ventilating, it will be observed that all air is taken in from the outside and passes through a tempering coil, which warms the air to a degree above freezing, then passes through a spray chamber, where it is thoroughly washed. The air then passes through an eliminator or drying tube, which dries the air so as to take out surplus moisture, giving the air the right humidity. It then enters the centrifical steel housed fan, and this fan forces the air out through an opening at right angles to the shaft and against a large number of feet of steam coil, where it is further heated and passes into a hot air or plenum chamber. The main heater coils are always set from three to four feet above the floor, thus providing a by-pass for cold air. At the end of the plenum chamber where the air is distributed into galvanized iron distributing ducts, are located a number of mixing and volume dampers. These dampers, especially the one for mixing, are so arranged in regard to the heat and the tempered air chambers that they permit of ready access of either hot or cold air into the distributing pipes. The temperature of the air in the distributing pipes is regulated by thermostats located in the different rooms of the building. Thus the rooms are kept at a constant and even temperature without any attention whatever from the occupants.

In the spray chamber referred to above are a large number of spray heads, arranged along the ceiling and sides of the room. The amount of water necessary for washing the air varies, of course, with the amount of air required. In the bottom of this spray chamber is a sump, which is connected with a pump, so that the water can be used over and over.

Other means of filtering the air are by the use of brass

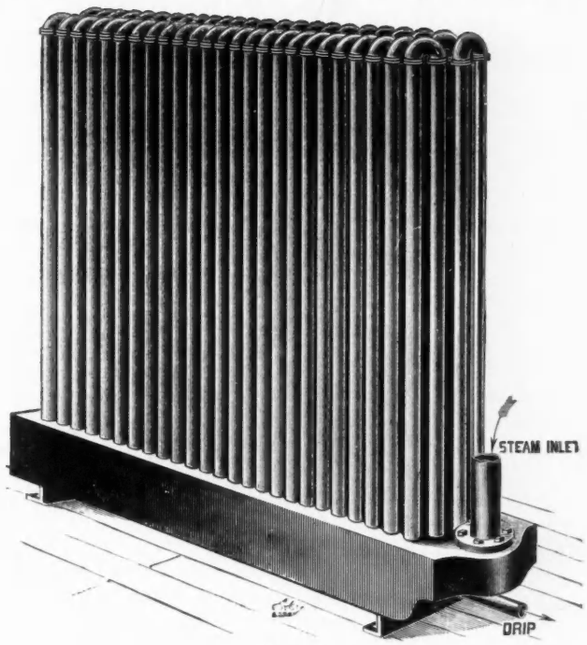



FIG. 7.

wire screens of very fine mesh, and by drawing the air through a charcoal filter.

In rooms where good ventilation is required, the air should be changed every ten minutes. Thirty cubic feet of air per minute should be allowed to each occupant. Good heating and ventilating apparatus will warm and change the air as specified above without causing any cold drafts and with the most economical consumption of power. The air should enter at the rate of about 300 feet per minute

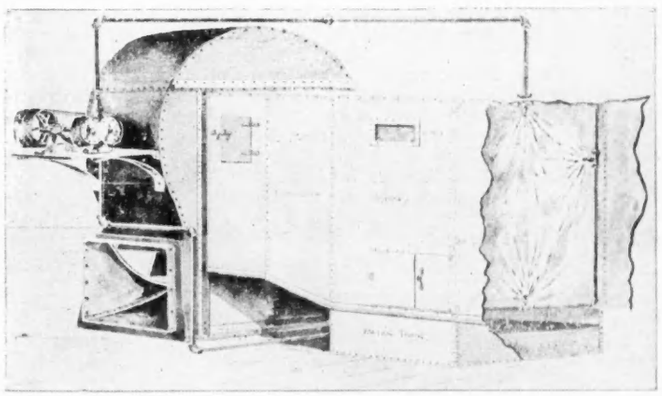
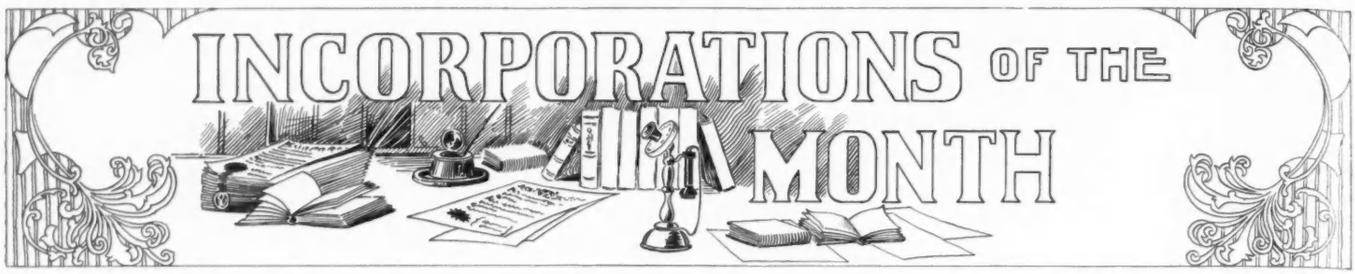


FIG. 8.

in order to avoid drafts and air currents. Good air does not contain over six or seven parts of carbonic gas in every ten-thousand parts, and when it rises above this the air becomes stuffy. The hot air openings into the rooms should be placed eight to ten feet above the floor level. Warm air entering the room would remain at the ceiling unless forced down by a fresh supply constantly coming in.

**Note: Illustrations used in this article show: Fig. 5, a fan wheel. Fig. 6, a full housing steel plate fan with the wheel enclosed. Fig. 7, a heater section. Fig 8, an air washer. Figs. 1 and 2 show sectional view of building.—The Editor.**




Clay County Rural Telephone Company, Clay Center, Neb.

Amo Telephone Company, Windom, Minn. Capital stock, $45,000.

Alto Telephone Company, Waupaun, Wis. Capital stock, $2,000.

Citizens' Telephone Company, Schoolcraft, Mich. Capital stock, $5,000.

Riverton Telephone Company, Riverton, Neb. Capital stock, $2,500.

Hurley Telephone Company, Sioux City, Iowa. Capital stock, $2,000.

Franklin Telephone Company, Franklin, Minn. Capital stock, $15,000.

Marshall Telephone Company, Marshall, Va. Capital stock, $14,500.

Surprise Telephone Company, Surprise, Neb. Capital stock, $50,000.

Home Telephone Company, Huntington, Ind. Capital stock, $10,000.

Independent Telephone Company, Yankton, S. D. Capital stock, $200,000.

Farmers' Mutual Telephone Company, Bondurant, Ia. Capital stock, $20,000.

Bainbridge Telephone Company, Bainbridge, Mich. Capital stock, $2,000.

Litchfield Telephone Company, North Adams, Mich. Capital stock, $2,000.

Washtenaw Telephone Company, Ann Arbor, Mich. Capital stock, $25,000.

Laingsburg Telephone Company, Laingsburg, Mich. Capital stock, $25,000.

Brendon Rural Telephone Company, Mt. Vernon, S. D. Capital stock, $10,000.

Windom Mutual Telephone Company, Windom, Minn. Capital stock, $20,000.

Clayton County Farmers' Telephone Company, Clayton, Ia. Capital stock, $1,900.

Western Electric Telephone Company, Sioux Falls, S. D. Capital stock, $1,000,000.

Sioux Falls Telephone Construction Company, Sioux Falls, S. D. Capital stock, $5,000.

Ludington-Scottsville Rural Telephone Company, Ludington, Mich. Capital stock, $30,000.

Ireton Rural Telephone Company, Ireton, Ia. Incorporators: F. Farenger and others. Capital stock, $8,000.

Eliot Telephone Company, Eliot, Me. President, C. E. Bartlett; treasurer, G. E. Hammond. Capital stock, $5,000.

Churdan Mutual Telephone Exchange, Churdan, Ia. Incorporators: H. Dudley and others. Capital stock, $1,500.

German Telephone Company, Beatrice, Neb. President, J. M. Shuster; secretary, John Busboon. Capital stock, $2,000.

Elba Telephone Company, Elba, N. Y. Incorporators: C. V. Gary, F. B. Parker, John Swartz. Capital stock, $1,000.

Amelia Telephone Company, Amelia, Va. Incorporators: R. H. Bruce, W. L. Mason, W. J. Townes, W. Gordon Harvey.

Fremont County Telephone Company, Thurman, Ia. President, M. Cartney; secretary, C. R. Payne. Capital stock, $12,000.

Garber Telephone, Garber, Okla. Directors: Wm. D. McVicker, Benton A. Garber, Milton C. Garber. Capital stock, $5,000.

Louisiana Pole Company, Ft. Worth, Tex. Incorporators: J. Taylor, Wm. G. Liggett, C. Houston. Capital stock, $10,000.

Marshville Telephone Company, Marshville, N. C. Incorporators: H. Bascom, M. K. Lee and others. Capital stock, $10,000.

New Sharon Independent Telephone Company, New Sharon, Ia. President, Wm. A. Bryan, Sr.; secretary, Walter E. Bryan.

Watseka Home Telephone Company, Watseka, Ill. Incorporators: J. E. Bundy, J. A. Bundy, H. M. Fisk. Capital stock, $20,000.

Charlottsville Telephone Company, Charlottsville, Ind. Incorporators: A. L. Sample, Wm. C. White and others. Capital stock, $270.

Clifton Park Telephone Company, Jonesville, N. Y. Incorporators: Erastus Forte, John McElroy, Robert Jump. Capital stock, $5,000.

Hendrum Telephone Company, Hendrum, Minn. President, V. H. Moffat; secretary and treasurer, A. H. Gordon. Capital stock, $5,000.

Citizens' Telephone Company, Lawrenceville, Ill. Incorporators: J. K. Dickerson, J. M. Spangler, C. W. Parkinson. Capital stock, $25,000.

Macomb Home Telephone Company, Macomb, O. Incorporators: A. I. Frucha, J. R. Shoop, R. O. Duval. Capital stock, $20,000.

Diamond Grove Telephone Company, Mifflin, Wis. Incorporators: H. A. Rundell, W. B. Little, James McDermott. Capital stock, $1,000.

Bi-County Telephone Company, Gosper, Neb. Incorporators: A. B. Chambers, A. L. Fritzler, Robert Stout, J. G. Pace. Capital stock, $1,000.

Arcola Grain, Coal and Telephone Company, Arcola, Ill. Incorporators: Joseph H. Ewing, John I. Hall, Joseph Coombe. Capital stock, $5,000.

Ellenboro Telephone Company, Ellenboro, N. C.

Rural Reciprocal Telephone Company, Flandreau, S. D. Capital stock, $10,000.

Riverside Telephone Company, Bainbridge, N. Y. Directors: Harrison G. Robbins and Louis B. Anderson, Bainbridge, J. J. Waters, Sidney.

Montgomery County Telephone Company, Dayton, Ohio. John T. Barlow, Leopold Rauh, Edward C. Cauby, Edward J. Artz. Capital stock, $200,000.

Dundee Telephone and Telegraph Company, Dundee, N. Y. Directors: C. J. Watson, Arthur Besemer, H. B. Harpending. Capital stock, $2,500.

Western Telephone and Telegraph Company, Chicago, Ill. Incorporators: F. W. Pringle, G. Hallett Johnson, H. S. Pringle. Capital stock, $2,500.

Clinton Air Line Telephone Company, Fitchville, Ohio. Incorporators: E. K. Jenning, S. M. Sly, G. D. Ramsey, D. Griffin. Capital stock, $1,000.

North Platte Telephone Company, North Platte, Neb. Incorporators: Geo. T. Field, Blanche Field, L. B. Dick, Chas. Temple. Capital stock, $25,000.

Western Union Independent Telephone Company, Lincoln, Neb. Incorporators: Chas. J. Bills, Allen W. Field, Frank H. Woods. Capital stock, $1,000,000.

Big Raccoon Telephone Company, Bridgeton, Ind. Directors: J. R. McMiller, Jas. Jones, Smith Montgomery, T. M. Bell, John Seller. Capital stock, $400.

Suisun and Green Valley Telephone Company, Suisun City, Cal. Incorporators: F. S. Jones, Fred O. Chadbourne, R. V. Robbins, J. S. Brown, Robt. Stewart.

Reich Telephone Company, Harrison, Ark. President, Frank R. Green; vice-president, Frank Pace; secretary and treasurer, J. L. Reich. Capital stock, $10,000.

Home Mutual Telephone Company, Stony Point, Ind. Directors: Joel Hall, W. B. Anglin, Alonzo Burket, J. K. Anglin, J. T. Byree. Capital stock, $10,000.

Levels Telephone Company, Levels, W. Va. Incorporators: W. H. Harmon, D. M. Dickend, H. Rounells, Ed. Johnson, M. L. Snyder. Capital stock, $5,000.

Stratford Telephone Company, Stratford, Ia. Directors: Edward Peterson, Chris Williams, Fred Ruegnitz, J. T. Drug, John A. Johnson. Capital stock, $1,500.

Allentown Telephone Company, Hancock, Ind. Incorporators: Daniel W. Lonebalk, W. W. Crider, J. W. Bash, Joseph A. Smith, R. F. Cook. Capital stock, $160.

Beaver Crossing Telephone Company, Beaver Crossing, Neb. Incorporators: J. H. Ritchul, W. J. Organ, A. A. Mahew, J. F. M. Dunery. Capital stock, $5,000.

Hamilton Telephone Company, Chattanooga, Tenn. Incorporaters: Z. C. Patten, T. W. Fritts, L. J. Sharp, H. O. Probasco, L. F. M. Gardenshire. Capital stock, $5,000.

Nichols Mutual Telephone Company, Nichols, Ia. President, John Nicola; vice president, R. C. Black; secretary, D. Merrill; treasurer, F. A. Carl. Capital stock, $2,000.

Mutual Telephone Company, Clay Center, Neb. Incorporators: R. H. Smith, W. W. Campbell, L. R. Jones, J. L. Perry, W. A. Summer, J. O. Latta. Capital stock, $5,000.

Pleasant Prairie Telephone Company, Pleasant Prairie, Wis. Incorporators: Harding Crowe, Frank Holt, Earl King, John D. Maloney, Frank Dartz. Capital stock, $3,000.

Cooperstown, Cherry Valley and Sharon Springs Telephone

Company, Cooperstown, N. Y. Incorporators: F. G. Ward, M. D. Eckler, Fred E. Hopkins. Capital stock, $5,000.

Old Dominion Telephone and Telegraph Company, Montgomery, Ala. Incorporators: W. T. Dunn, E. R. Humphrey, J. J. Byer, W. P. Roberts, Thos. Young. Capital stock, $10,000.

South Charleston Home Telephone Company, South Charleston, O. Incorporators: S. B. Rankin, Alex Renick, E. R. Sharp, Frank L. Beam, Frank A. Davis. Capital stock, $5,000.

Citizens' Mutual Telephone Company, Schoolcraft, Mich. President, L. D. Berry, Grand Rapids; secretary and general manager, R. E. Burney; treasurer, B. J. Munn. Capital stock, $5,000.

Clayton County Telephone Company, St. Olaf, Iowa. President, K. K. Sterns; vice president, A. L. Peterson; secretary, Otto O. Johnson; treasurer, John Johnson. Capital stock, $1,920.

Interstate Telegraph and Telephone Company, Parkersburg, W. Va. Incorporators: W. B. Hartley, Chas. Bekurs, Jr., E. E. Ryan, J. H. Fletcher, A. C. Budge. Capital stock, $25,000.

Washington Telephone Company, Washington, Iowa. President, L. D. Robinson; vice president, H. M. Eicher; secretary and manager, E. G. Fox; treasurer, F. H. Smith. Capital stock, $60,000.

Hoosier Telephone Company, Portland, Ind. Incorporators: J. A. Jaqua, L. G. Holmes, John Dedamore, C. C. Cartwright, C. F. Headington, J. C. Cromfield, O. H. Adair. Capital stock, $10,000.

Posey County Home Telephone Company, Mt. Vernon, Ind. Incorporators: Chas. McGregor, Wm. McGregor, Mt. Vernon; Allen Gray, Evansville; Wm. Ford, New Harmony. Capital stock, $30,000.

Deer Creek Cooperative Telephone Company, Deer Creek, Ind. Directors: A. J. Cook, A. A. Newer, Samuel Mitchell, Daniel M. McClosky, Perry Johnson, J. D. Zartman, C. B. McClosky. Capital stock, $3,000.

Arlington Telephone Company, Arlington, Neb. Incorporators: C. C. Marshall, A. G. Ludwig, H. W. Marshall, Henry Hilgenkamp, H. W. Rechmeyer, A. H. Unland, C. Vail, W. H. Lessing, W. J. Ludwig, E. A. Davies.

Thomas Telephone Company, Thomas, Okla. Incorporators: R. A. Smith, F. T. Crowley, J. E. and Oscar Zimmerman, Oscar Mo.; D. L. Kinzer, Holt, Mo.; Jos. T. Riley, Liberty, Mo.; O. F. Mitchell, Thomas. Capital stock, $10,000.

## CURES TELEPHONE KICKER.

"We don't see much of life," said a telephone girl, recently, "but we hear an awful lot of it."

It is a fact well known that girls with weak or unsteady nerves can not stand the work. A good hello girl should not only possess good health and strong nerves, but should be endowed with a keen sense of the ridiculous, a certain amount of diplomacy, tact, and even downright hypocrisy, and an abundance of good humor. The girl who gets out her handkerchief and goes about her work softly crying, over the impudence and growling of some of the veteran kickers, or the one who loses her temper, will never do for an operator. The girls who smile while the patron is having a fit at the other end of the line, and who have a knack of smoothing the snarl out of his temper, are quite likely to be retained.

About a year ago there was an insignificant and obscure government clerk in one of the departments at Washington, who had the reputation at the central office of being the most abusive, disrespectful and utterly brutal kicker in the city. All the girls dreaded him, and those who smiled at the vituperations of the rank and file of those on the kicker list trembled when called upon to answer this particular subject. Finally he became so abusive that the matter was reported to the manager, who advised the usual course, thinking, perhaps, that the fault lay with his employes, and pursuant to his instructions, the operators tried in every possible manner to placate this man, giving him prompt service, and doing all in their power to remove grounds for complaint. But their efforts were all to no purpose. It made no difference to him whether he had grounds for complaint or not. What he wanted was something to abuse, and finding the girls helpless, he indulged his ill humor to the full extent every time he went to the telephone.

Finally things got to such a pass that a majority of the operators refused to answer his calls, and one day when one of the few who were still willing to bear his impudence responded he abused her so outrageously that she fainted, was thrown into hysterics and had to be taken home in a closed carriage. The manager witnessed this scene, and in order to satisfy himself that it was genuine, he answered, imitating as well as he could the feminine voice, and listened for the space of nearly five minutes to a string of billingsgate and abuse worthy of a Mississippi river steamboat mate directing the operations of a string of roustabouts. The manager had once been employed on a newspaper and understood shorthand, and as the government clerk poured forth a torrent of abuse he took down his utterances, word for word, without losing a single sentence. At the conclusion of this storm of insolence the manager, with ears and cheeks as red as an auctioneer's flag, turned to the operators and said:

"I'll fix him." And fix him he did. Going to the office he had a typewritten copy made of the billingsgate used by the government clerk, which he had just taken down. Then he wrote a letter to the head of the division under whom this man worked, inclosing the sample of the language used by his subordinate in talking to the operators, concluding the letter with a statement that unless it ceased he would be obliged to discontinue the service in that arm of the federal service. The head of the division was acquainted with the telephone manager and knew what he said was true. Moreover, he also was quite familiar with the clerk, and none too fond of him at that. He had long waited an opportunity to catch this fellow red-handed, and the letter from the manager was as welcome as the cry of "land" to the weary and disheartened crew who served Columbus on his first voyage. He lost no time in taking Mr. Clerk to task in the matter. The clerk, of course, denied the charge, but when confronted with the very words he had used the evening before he wilted. To-day he has the reputation of being the meekest and most courteous patron on the list.

## TSI ANN AND THE TELEPHONE.

"Now," said the empress, settling herself comfortably on the throne, "what new wonder have you to show me to-day? What is the next curiosity you have brought from the home of the foreign devil, also of the free and the brave?"

"This, your majesty," answered Wu, dexterously extracting an oddly shaped contrivance from his trunk, and dragging about a hundred feet of wire after it.

"What is it, anyway?"

"O daughter of the moon and mother of the stars, it is the telephone."

"But telephones were invented right here in China ten thousand years ago."

"True, most graceful gazelle of the mountains. True, but not such a telephone as this. Have the condescension to put your ear here and your lips here, and say, 'Hello!'"

Tsi Ann did as she was asked, and from the internals of the strange device came a voice which repeated monotonously:

"The line is busy. Please call again. The line is——"

"Give me main double two aught six one four plus," called the empress.

"The line is busy. Please call——"

"I want double two aught six one——"

"Ring off. The line is——"

"When can I get that——"

"Gimme double two——"

Bz-z-zr-r-r-r-rbip!

Whirling in truly regal anger, Tsi Ann, first cousin to the Thunder Cloud, and adopted daughter of the Cyclone, exclaimed:

"Throw that thing out of the palace!"

"Ah, your upliftedness," smiled Wu, with one of his holiday bows, "you are, indeed, becoming Americanized."—*Chicago Tribune.*

## INDEPENDENT TELEPHONY IN NORTH WESTERN CANADA.

J. B. DONALD

J. B. Donald of Calgary, Alberta, Canada, has spent some considerable time in Chicago and other American cities in inspecting the different makes of Independent telephone apparatus and the systems in successful operation in the cities and small towns in order to become familiar with the latest product of Independent manufacturing plants and decide on suitable apparatus for the equipment of the entire system to be installed by the Western Telephone Company, Limited, with headquarters at Calgary, Alberta, Canada. Mr. Donald is also completing the financing of the company, it being his intention to build lines and exchanges covering the most populous section of western Canada.

Mr. Donald is a Canadian by birth and has built a number of Independent telephone systems. He constructed a hundred and fifty miles of toll lines for the Columbia (Washington) Telephone Company, and acquired the lines, as well as the Columbia company and the Spokane and British Columbia Telephone Company, operating eleven exchanges and nearly six hundred miles of toll lines in Washington and British Columbia. The proposed system will be modern in every particular. In speaking of the plans of his company Mr. Donald says:

It is proposed to establish a system of communication by telephone throughout Alberta and a company has been organized for that purpose. Every town of importance in Alberta is represented by having the most prominent business man as a stockholder in each town throughout which the proposed lines will run. In the towns where the business men have not taken stock they either represent and control an Independent telephone system in the town or have given the proposed company an exclusive franchise to operate in their town for ten years. In places where the company is not represented by stockholders or having an exclusive franchise, the Independent telephone systems have entered into an agreement to connect and work exclusively with this company for a term of years.

It is proposed to build from Edmonton to Calgary, and south to Macleod, then west to Pincher and Frank, then southeast to Cardston, then east to McGrath, Raymond and Stirling, then north to Lethbridge. The line would be built of No. 10 copper wire fastened to seven foot cross-arms on twenty-five foot cedar poles, eight inches at top, and the work would be first-class in every respect. The equipment will be the latest improved apparatus.

Branch lines will be run from Edmonton, east for twenty-two miles; from Wetaskiwin east to Rodberg, Rosenroll, Duhamel, Lester, and Louisville; forty miles from Lacombe east to Lamerton, and west to Bentley, from Cardston southwest to Kimball and Taylorville.

The Edmonton Telephone Company has an exchange in Edmonton of 200 telephones and fifty-four miles of toll lines and twenty-two miles under construction. Arrangements have been made to operate with this company and to connect at Leduc, twenty miles south of Edmonton. This system can be bought by this company if necessary, and in the estimated expenditure an allowance of $25 000 is made to purchase the assets of the Edmonton Telephone Company.

The approximate number of miles in the system will be as follows:

| | Miles. |
|---|---|
| From Leduc to Calgary | 175 |
| From Calgary to Frank | 158 |
| From Pincher to Lethbridge | 110 |
| From Wetaskiwin to Louisville | 40 |
| From Lacombe to Lamerton | 30 |
| From Lacombe to Bentley | 15 |
| | 528 |
| Edmonton system | 76 |
| Total number of miles | 604 |

The towns, cities and telephone stations on this system of 604 miles would be as follows: Calgary, Airdrie, Crossfields, Carstaire, Didsbury, Olds, Bowen, Innisfail, Penhold, Red Deer, Blackfalde, Lacombe, Morningside, Penoka, Wetaskiwin, Millett, Leduc, Beaumont, Ellerslie, Strathoona, Edmonton, River Q Barre, Saint Albert, Morrinville, Clover Bar, Fort Saskatchewan, Rodberg, Rosenroll, Duhamel, Olsten, Louisville, Tees, Pleasant Valley, Lamerton, Bentley, Midnapore, Okotoks, High River, Nanton, Clairsholme, Leavings, Macleod, Cowley, Pincher, Frank, Blairmore, Cardston, Aetna, Kimball, Taylorville, Fishburne, Yarrow, Caldwell, Mountain View, Leavitt, Sp'ng C'lee, McGrath, Raymond, Stirling, Lethbridge.

Exchanges will be installed in the following towns:

| | Population. | Telephones. |
|---|---|---|
| Calgary | 7,000 | 250 |
| Lacombe | 700 | 25 |
| Wetaskiwin | 2,000 | 75 |
| Okotoks | 500 | 20 |
| High River | 500 | 20 |
| Cardston | 1,000 | 35 |
| McGrath | 500 | 20 |
| Raymond | 1,200 | 35 |
| Lethbridge | 3,000 | 100 |
| Stirling | 500 | 20 |
| Total number of telephones | | 600 |
| EXISTING EXCHANGES TO BE TAKEN IN. | | |
| Edmonton | | 206 |
| Red Deer | | 50 |
| Pincher | | 25 |
| Frank | | 25 |
| Macleod | | 65 |
| Telephones | | 371 |

The cost of installing telephones is approximately $50.00 per telephone, in towns up to 10,000 population and under.

The total outlay will be $264,200.00. Of this amount the business men have contributed $50,000.00, taking six per cent preferred shares at par. This will leave $225,000.00 to be borrowed on first mortgage bonds covering the total assets and franchises of the company.

A recapitulation of the proposed system cost and earnings is as follows:

| | | |
|---|---|---|
| Total receipts per month | | $6,500.00 |
| Total expenditure per month, fixed charges, including maintenance and depreciation of plant | $1,967.50 | |
| Operating expenses and salaries | 1,467.00 | |
| | | 3,434.50 |
| Balance profit per month | | $3,065.50 |

The proposed system will connect with the states, and it is aimed to make it cover the most populous section of western Canada.

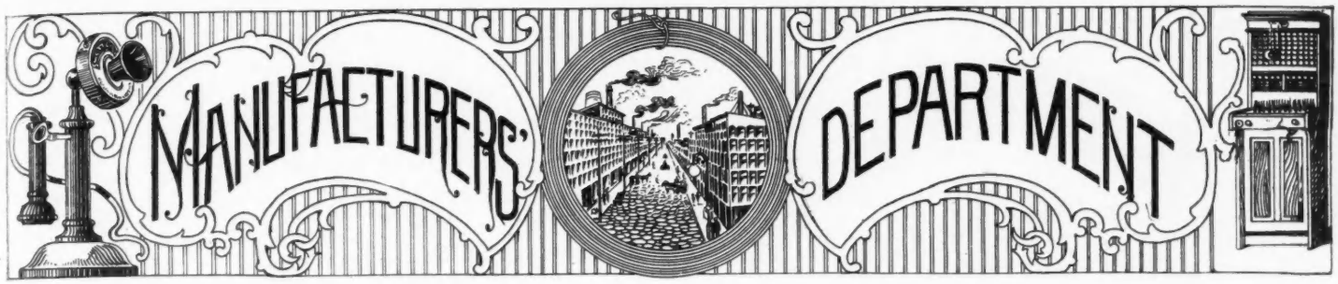
## THE TELEPHONE IN SURGERY.

For some time the telephone has been in use in London hospitals when it is necessary to probe wounds for bullets or other metallic objects. A receiver is connected by a wire to a metal plate and to a "sound" or probe. The metal plate is applied to the body of the patient, care being taken to obtain a good contact with the skin by placing under the plate a moistened sponge or blotting paper saturated with salt water. The surgeon takes up the receiver, which is held against the ear by a head band. When the probe is introduced into the wound the circuit closes; but a current is not produced until the probe encounters the metallic body lodged in the wound. A buzzing is then heard in the telephone.

This, in fact, is only a repetition of the celebrated experiment of Galvani, who was the first to ascertain that in case of contact between two different metals, particularly if a liquid intervene, an electric current is produced.

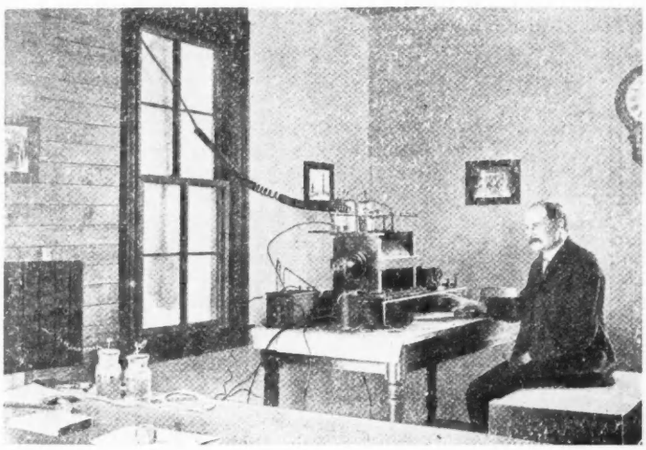
By this method surgeons have detected easily and certainly the presence in wounds of needles, bullets, bits of lead and fragments of copper and steel. It should be mentioned that no result is obtained when the foreign substance is of the same metal as the probe, and so it is necessary to have at hand probes of different metals.—*L'Electricien*, translated for TELEPHONY.

TELEPHONY is all right, and just what every telephone man ought to have.—A. J. Strubhar, Needy, Oregon.

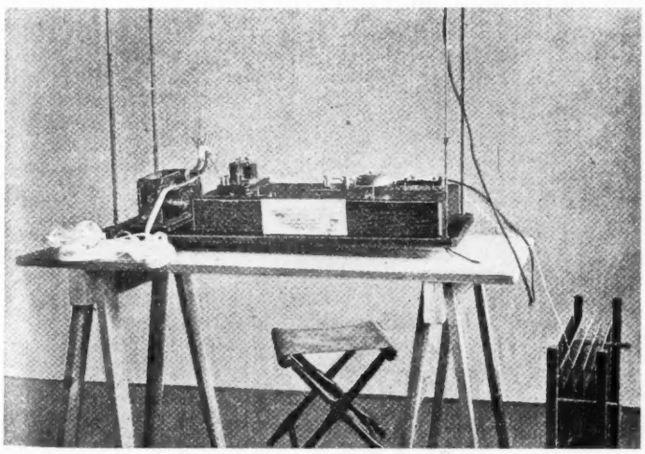



## FIGHTING ISLAND WIRELESS STATION.

Many persons will be astonished to learn that one of the first wireless telegraph stations on this continent and certainly the first in Canada, is the Fighting Island station, situated near the old historic Canadian fort at Amherstburg, Ont., says the Canadian Electrical News. It was established over a year ago in conjunction with a station at Detroit, and is still in actual operation, being controlled and owned by the Clark Wireless Telegraph-Telephone Company, incorporated by the State of Michigan. This company, at the head of which is Mr. Thomas E. Clark (a Canadian, born in the County of Essex), has its factory, laboratories and testing station at Detroit, Mich.



INTERIOR VIEW OF FIGHTING ISLAND STATION, CANADA, EQUIPPED WITH COMPLETE WIRELESS APPARATUS.



INTERIOR VIEW OF FIGHTING ISLAND STATION, CANADA, SHOWING WIRELESS RECEIVING INSTRUMENT.

The international line between Canada and the United States was opened by the Mayor of Detroit, a copy of the message being attested over the Mayor's signature as below:

Executive Office, Detroit, Mich.

William C. Maybury, Mayor—

"Michigan has given to the scientific world many illustrious names. Among them Watson, the great seer of the skies: In geology, Houghton and Winchell: To the electric world Vanderpool, who first made practical the electric railroad. Here Edison received his first inspirations, and now we may hope that a compeer, if not a greater than Marconi, may have arisen in this favored territory.

Correct as received,

William C. Maybury."

EXTERIOR VIEW OF FIGHTING ISLAND STATION, CANADA, SHOWING MAST FOR WIRES 225 FEET HIGH.

The Clark Company is making a special feature of the manufacture and supply of college and educational plants or apparatus. It will also supply complete plants to any companies wishing to go into the business of wireless telegraphy or telephony. It can furnish the smallest plant from an experimental students' set up to one for two hundred miles transmission.

When a representative of this journal called at the Detroit testing station, every facility was afforded him to test the accuracy of the message received. He saw messages sent and answered, and himself personally received a message at Detroit, via "wireless" from the Fighting Island station.

The message as received comes over a ticker or receiver in the Morse code of dots and dashes. In the laboratory he saw wireless alarm bells; a button pressed at one end of the room started an alarm at the other end. The company has several patents already out covering new features in wireless work, one of which will do away with collisions on railways if the engineer is not deaf to an alarm bell. Another interesting thing shown was a small motor being driven by wireless current. He asked himself the question, "When will the possibilities of electricity cease?"

The diligence of Marconi, Clark and other workers all over the world has brought wireless telegraph-telephone appratus past the experimental stage. Much remains to be done, but much has been done, so that both systems, and especially apparatus, have been put into what will no doubt prove to be a more or less final form.

Mr. Clark, the general manager, himself an electrician of considerable experience, formerly with the General Electric Company at Schenectady, N. Y., has associated himself with some of the best French and German experts, and a large new factory is about to be built at Detroit.

We have much pleasure in giving an interior and exterior view of the Canadian testing station at Fighting Island.

## THE "H. W. W." WIRE-CONNECTOR.

In telephone, telegraph or other electric wire construction it is common practice to use only two or three principal sizes of wire, differing slightly in diameter and in their use. It is often desired that these wires be connected in such a manner that they can be easily disconnected for testing or other purposes. As such test-connections may be required on two large or two small wires, or upon one large and one small wire, a device at once suited to these various uses should be of great practical value.

To meet these requirements the "H. W. W." wire connector has recently been devised. It is simple, inexpensive and effective, and has been adopted as standard by the large telephone companies operating in Ohio, Illinois and adjoining states. Its success makes it worthy of the consideration of other similar companies.

The "H. W. W." test connector, as shown in Fig. 1, consists of two copper plates clamped together by a brass bolt passing through one plate and screwing into the other, whereby the plates may be tightly clamped upon the wires by means of a wrench or by using a screw-driver in the slotted bolt head. A lock-nut holds the plates firmly in position against loosening by vibration.

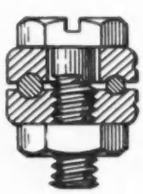
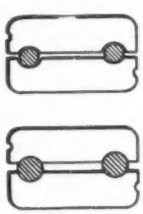


FIG. 1.



FIGS. 2 AND 3.

The novel feature of this connector consists in each plate

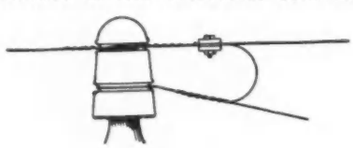


FIG. 5.

being cut with two accurately formed, cylindrical grooves of different depths, which, with the single bolt, makes the clamp applicable to various combinations of several different sizes of wire. In Fig. 1 the plates are shown in position for use on one large and one small wire (as No. 16 and No. 14, or No. 14 and No. 12 wires common in telephone practice), the relative positions of the plates being indicated by the two small grooves cut in the right-hand sides of the plates.

By simply reversing one of the plates around the bolt the connector is made applicable to two wires of the same diameter (.064 inch, .104 inch or any intermediate diameter) as shown in Figs. 2 and 3.

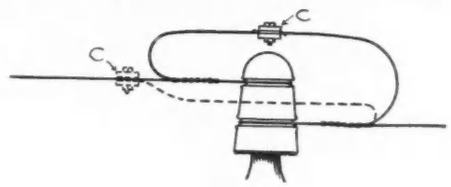



FIG. 6.

In telephone work it is often necessary to connect a branch wire to a continuous main wire, to which purpose the "H. W. W." test connector can easily be applied, as in Fig. 4. One of the common applications is the connection of branch wires or "drops" to the main wires of a party line circuit. The manner of making the connection is indicated in Figs. 5 and 6. This form of connector can be easily slipped over and fastened upon a through wire so that the intermediate branch connections can be made after the circuit has been established.

FIG. 4.

FIG. 7.

Two wire ends can also be connected (Fig. 7). By the use of this connector upon "individual" telephone circuits at the pole where wires "drop" off to the subscriber's station it is possible to reduce the size of wire in the short "drops" to No. 16 (.064 inch), instead of continuing the No. 14 (.080 of an inch) wire of the main circuit, and thereby save enough in cost of wire to pay for the test connector, besides securing the advantage of having a test joint instead of a twisted tube or other permanent joint (Fig. 8). This saving can of course be made by also using No. 16 wire for all "drop" wires on party lines. Such test connections can also be made to advantage at cable poles between the ærial wires and the wires connected to the cable conductors.

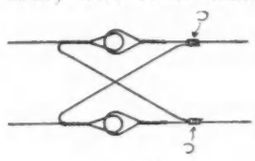


FIG. 9.

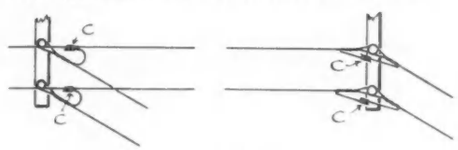



FIG. 8.

This connector is also used extensively for test joints in toll lines on transportation poles at intervals of five miles or less (Fig. 9).

Although especially useful in telephone and telegraph construction, the "H. W. W." connector can also be adapted to electric light and power wiring, battery connections, etc. It is claimed to be a great improvement over the old two-bolt connector with V-grooves, is efficient in its varied applications and compares favorably in cost with twisted tube joints. It can also be easily removed if desired and used indefinitely.

In ordering the diameters or numbers and gauge of wires

to be used in the connector should be given. The standard form of "H. W. W." connector for telephone work is seven-eighths of an inch long and is designed for use on either two No. 16 (.064 inch), two No. 12 (.104 inch) or two wires of any intermediate diameter; one No. 16 and one No. 14 or one No. 14 and one No. 12 wires.

Prices and samples will be furnished upon application to Benedict & Burnham Brass and Copper Company, 211 Lake street, Chicago, general sales agents.

## ROTH BROTHERS MOTERS.

Roth Brothers & Company, Chicago, have recently removed from 88 West Van Buren street to larger quarters at 27-29 South Clinton street. The new location gives the company double its former floor space and additional machinery has been added which more than doubles the ca-

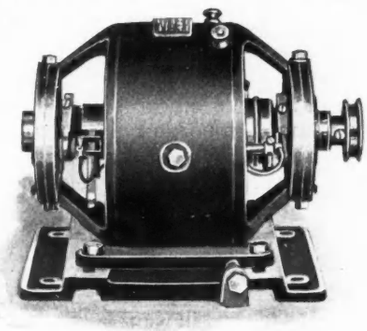


FIG. 1.

pacity for executing orders. All machines in the new plant are equipped with individual motors, affording modern facilities for the production of modern apparatus. The company has an enviable reputation with the telephone trade. In the construction of ringers and generators great care is exercised in adhering to standard sizes and interchangeable parts. Magnet poles are specially treated; armatures are carefully built up with tested material; commutators are assembled, giving close application to the manner of tempering and collection of segments; brush holders are of original design and the bearings have features embodied in

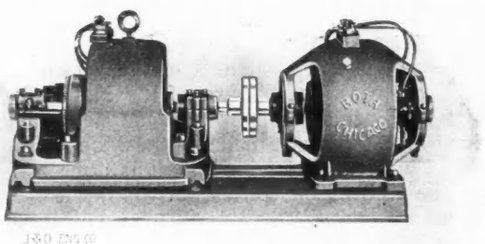


FIG. 2.

no other models. Every machine, large or small, is thoroughly tested for capacity, speed, insulation, etc., and does not leave the factory until it has carried its full load for a fixed number of hours, and twenty-five per cent overload for a definite period, and runs successfully and efficiently during this trial. Every machine has the company's guaranty for one year against any inherent defects, electrical or mechanical.

Three types of the Roth Brothers & Co. machines are shown by illustrations herewith. Fig. 1 is a ringing generator used in telephone service and fully described in the company's bulletin No. 150, which will be supplied on request. Fig. 2 is a single-phase alternating-current motor driving a "Roth" direct-current generator. Fig. 3 illustrates a direct-current motor driving an alternating-current generator. Illustrated descriptive circulars concerning Figs. 2 and 3 will be supplied on application. Many telephone exchanges are equipped with machines of the type illustrated and a number of them are installed in the service of the government. The standard windings employed are for 110

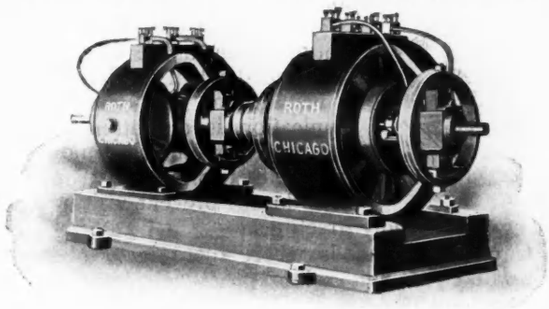


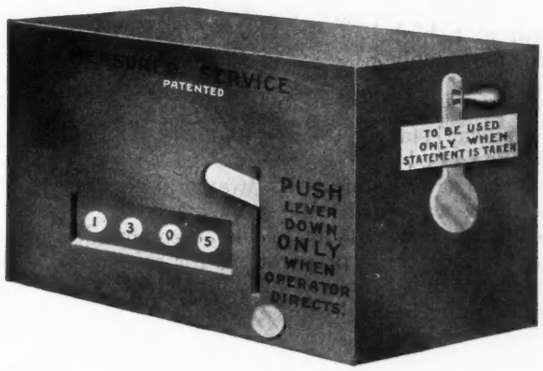

FIG. 3.

or 220 volts, direct current, but we are advised that windings for other voltage can be made to order.

## A REGISTER FOR MEASURED SERVICE.

The accompanying cut shows a telephone meter for measured service which is claimed to be the first practical machine that has made its appearance for measuring calls. The actual size of the device is 2½ by 2½ by 4¾ inches. The machine registers calls at the sub-station and is so arranged that the number of calls registered at the end of the month is transmitted over the wire to the central office.

The central office machine is an ordinary fire-alarm register, which receives the statement on a tape. This meter




appears to be the only one at the present time which comes anywhere near meeting the requirements of telephone companies who are operating on the measured service plan.

The machine will, no doubt, eliminate a great deal of the flat rate business. All engineers and telephone men are practically agreed that measured service is the only business-like basis on which a telephone company can operate. It is fair both to the customer and to the telephone company. It insures pay for every connection, the large user becoming a profitable customer as well as the small one. A full explanation of circuits and connections will be given in our next issue, showing how the device is used with practically all telephone systems now in use.

A NEW and attractive pamphlet entitled "For They Themselves Have Said It" has just been issued by the Swedish-American Telephone Company. The pamphlet is a series of interesting letters from those prominently interested in Independent telephony, accompanied by half-tones of the writers, and may be had for the asking.

## OM E ADVANTAGES OF FARM TELEPHONES.

HE farm that is in telephone communication with neighboring farms and nearby towns at once becomes a part of a close social body and is in constant touch with everything that is going on in the vicinity. The isolation of farm life is no longer to be dreaded when a telephone circuit is installed on it. Neighborly communication is a matter of seconds and does not require a more or less extended trip. Rainy or stormy days do not prevent visiting and the interchange of friendly greetings.

In many neighborhoods where there is telephone communication between the various farms, telephone parties are common, all the farms connected with a given exchange being connected and the neighbors spend a pleasant hour or two visiting without leaving their own homes.

In case of sudden sickness or serious accidents, help may be called without delay, and almost invariably the physician may be summoned almost instantly. There are numerous instances that might be cited in which life has been saved by this facility of communication.

A prominent cattle raiser of Illinois told the writer of making a large sum of money by being in close touch with the market through having a telephone in his home. A telegram came to him one morning saying that if he could get his cattle on the next day's market in Chicago, he could sell them at a high price, as the supply had run short temporarily. The agent at the railway station immediately called him up at his home miles away and repeated the telegram without waiting to send it by messenger as would have been necessary without telephone communication. The stockman at once began preparations for shipping his cattle. Cars were arranged for by telephone and telegraph and the next morning he loaded his cattle in time to catch a fast freight and before noon they were in Chicago, more than 100 miles away, and were sold to such an advantage that the interest on the gain in price over that of the next day would pay the cost of his telephone many times over. This is a common experience with farm telephones. It is always to the interest of railways and grain buyers to establish communication with country districts and they invariably do so. The farmer who has stock or grain to sell can, if he has a telephone, get accurate market reports without delay and be in a position to take advantage of any rise in the market at once.

In Putnam County, Illinois, where farm telephones were first installed in Illinois, a tramp came along one day and threatened a lady who refused to cook a meal for him. Having considerable courage this lady succeeded in frightening the tramp away. Knowing that the wife of the next farmer on that road was alone, she telephoned her to look out for the tramp, and this lady sent the word on down the line. At each house the ruffian found the doors closed and continued on his way. The husband of the lady first threatened was called in from the field and he immediately arranged with others on the telephone line to keep the tramp in view, and the police of the nearest town were notified to meet him at the borders of the town. This was done and the man was arrested.

In a hundred different ways the telephone makes farm life safer, pleasanter and easier. The cost is trifling as compared with the advantages, and it is safe to say that any farm family that has had a telephone installed in its home for one year could not be persuaded to have it taken out and go back to the old way of living alone.

The telephone promotes sociability, prevents neighborhood quarrels by allowing any little disagreements to be adjusted at once instead of standing to be brooded over and magnified.

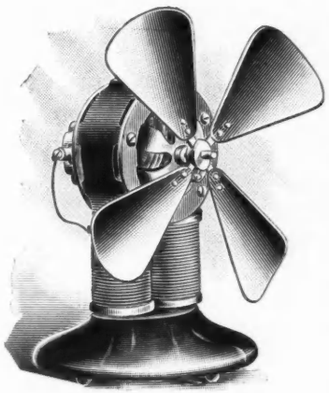
With a telephone the farmer's family becomes a part of a great body of neighbors instead of an isolated unit cut off from regular and frequent communication with the remainder of the world. In the onward march of progress nothing will play a more important part than the rural telephone. It is gaining friends all the time, and keeping all it makes.—From Stromberg-Carlson Telephone Manufacturing Company's Bulletin No. 2.

## NEW CABLE SLEEVE AND POT HEAD.

At the Philadelphia convention a year ago the New Haven Novelty Machine Company first introduced its cable sleeves and pot heads to the Independent telephone fraternity. At that time the company was unknown and had practically none of its devices in use. But small progress was made till the interstate meeting in December last, where its exhibit attracted great attention and where the advantage was had of being able to refer to several plants in which the Novelty sleeves and potheads had been installed. Since that time the growth of the business has been phenomenal, there being at this time over 3,000 pieces of the company's product in service, and the company points with justifiable pride to the fact that of this large number not one has been returned as defective. It became apparent early in this year that the business was growing so largely that a Chicago office was a necessity, and on May 1st Mr. H. J. Minhinnick opened an office at 1112 Merchants Loan and Trust building, where he has since attended to the Western end of the company's business. A feature of the National convention exhibit made by this company was the clever adaptation of its device to the terminals made by the Moon Manufacturing Company, by which the wiped joint is done away with on terminals as well as on splices and potheads. Mr. Woods of the Moon Company was in attendance and showed the benefits of this device to a large and interested number of visitors. The exhibit of the Novelty company was in charge of Mr. H. Grant Thompson of New Haven, president, and Mr. Minhinnick, Western representative, although these gentlemen had little to do on account of the number of enthusiastic customers, who were in attendance at the convention and did most of the "boosting." In addition to the home and Chicago offices the goods made by the company may now be obtained from all jobbers and also from most of the cable and telephone manufacturing companies.

The Cincinnati (Ohio) Commercial-Tribune, in chronicling the progress of the Michigan Telephone Company's legal and financial troubles, concludes: "The Michigan Telephone Company controls all the telephones in the state of Michigan." Surely the story of Rip Van Winkle was founded on facts, after all.

## DRY BATTERY MOTOR FAN.



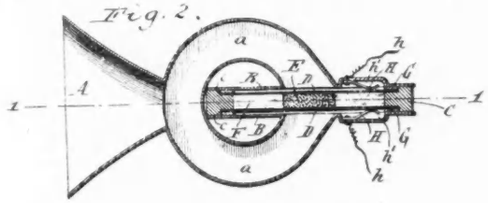
The Acme Electric Company, Chicago, is manufacturing a motor fan for telephone booths that is novel because it receives current from common dry batteries. The manufacturers claim that it can be successfully operated by the use of worn-out dry batteries which accumulate in all telephone exchanges. It is made in two sizes, seven and nine inches, and is guaranteed to run from 200 to 300 hours with four dry batteries. From the manufacturers' claims there should be no good reason why telephone men should suffer from hot weather. It is indispensable for hospitals or sick rooms and the price is very moderate.

## A. C. DALLAS.

The Benedict & Burnham Brass and Copper Company is represented in Chicago by its secretary-treasurer, A. C. Dallas, whose thorough knowledge of the business makes his position most valuable to the company's interests. Mr. Dallas is a Canadian by birth. In May, 1895, he accepted a position with the Benedict & Burnham Manufacturing Company, Waterbury, Conn., as selling agent, a place he held until May, 1901, when he resigned to become secretary-treasurer of the Benedict & Burnham Brass and Copper Company, and to assume the management of the Chicago branch, 211-213 Lake street. The business of his company is prospering, and Mr. Dallas attributes this success more to the excellence of his product than to his personality.

## DOUBLE DIAPHRAGM TRANSMITTER.

The figure below illustrates the construction of the double diaphragm telephone transmitter, patent No. 557,741, dated April 7, 1896, now being manufactured by the Tillman & Enler Telephone Company, 332 Woodlawn avenue, Buffalo, N. Y. A recent practical test of this transmitter was made



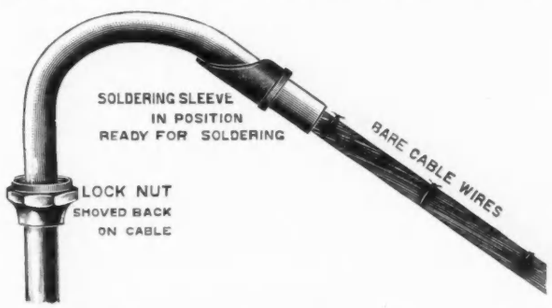

over the lines of the Illinois Central Railroad Company's lines, which proved that the transmitter can be used on an ordinary iron telegraph wire. The Chicago Tribune, commenting on this test, says:

A train crew 400 miles from Chicago talked over the telegraph wires yesterday to Chief Operator Parsons of the Illinois Central railroad at the Twelfth street depot. As a result the railroad telephone of the Tillman & Enler Telephone Company, Buffalo, N. Y., was declared to be a success. The train was stopped near Fulton, Ky., and the Tillman & Enler telephone was connected with the regular telegraph wire running to Chicago. In spite of the fact that the message had to travel over iron wires which ran parallel to more than a score of other wires, every word was distinctly heard by Mr. Parsons. The inventor asserts that it makes no difference whether or not telegraphic messages are being flashed over the wires simultaneously with the telephone messages. This was tested by the successful transmission of a telegraphic communication from Fulton at the time Parsons was conversing with the crew.

The manufacturers' circular claims many strong points for this transmitter, stating that it differs from all others because of having two distinct diaphragms which gives double the power of single diaphragm instruments. These diaphragms have carbon granular between them. It is impossible to poke the diaphragms and it is claimed that they do not pack. It will work in any position and it is not necessary to talk into the mouthpiece. Where in use, the transmitter gives perfect satisfaction. Those interested in this device are invited to correspond with the manufacturers.

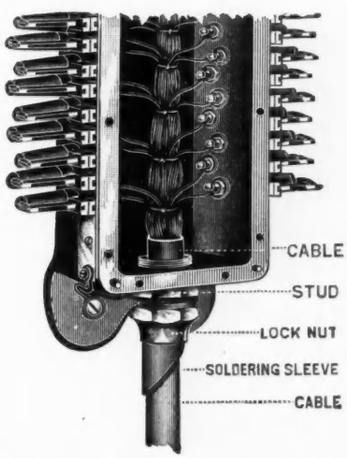
## A SIMPLE MEANS OF INSTALLING A TERMINAL HEAD.

The accompanying cuts show a new way of connecting a cable to a terminal head by means of what is termed a "novelty nozzle" similar to what is known as the novelty sleeve used in splicing cable and manufactured by the New Haven Novelty Machine Company, New Haven, Conn. The Moon




Manufacturing Company has adopted this nozzle for use with the Moon terminal head.

This nozzle consists of three parts: They are the stud, which is set in the terminal head; the soldering sleeve,




which has a tinned and tapered lip, and a lock or retaining nut.

With this style nozzle a wipe joint is done away with and the terminal is as easy to install as a pot head. The solder is run inside of the tinned and tapered lip with a soldering iron, forming a strong and complete joint.

The operation of connecting the cable to the terminal head and sealing it by this joint is quite simple. The lock

nut is first slipped over the cable and then the soldering sleeve is soldered onto the cable in its proper place, which is determined by measurement. Before passing the cable end into the terminal head a sufficient amount of lead casing of the cable is stripped off to enable the cable wires to be connected to the terminal connections on the inside of the terminal head. The cable is passed through the stud into the terminal head, then the lock nut is slipped into its place and screwed hard to the stud in the terminal head with a wrench, and the operation is complete.

The terminal may be fastened in place on the pole before the cable is attached, and of course there is no wipe joint used.

The Moon Manufacturing Company was quick to see the advantages in using this style of nozzle and is placing them in the Moon terminal head where desired at no additional cost.

## A MERITORIOUS WORK.

"Telephony" is the title of a work by Arthur Vaughan Abbott, C. E., which is being issued by the McGraw Publishing Company, New York. It comprises six volumes in all, of which three have been published, and the remaining three will appear in a short time. Each volume is devoted to some one phase of telephony, the six bearing the following titles, respectively: Part I, "The Location of Central Offices"; Part II, "The Construction of Underground Conduits"; Part III, "The Cable Plant"; Part IV, "Open Wire Lines"; Part V, "The Sub-Station"; Part VI, "Switchboards and the Central Office."

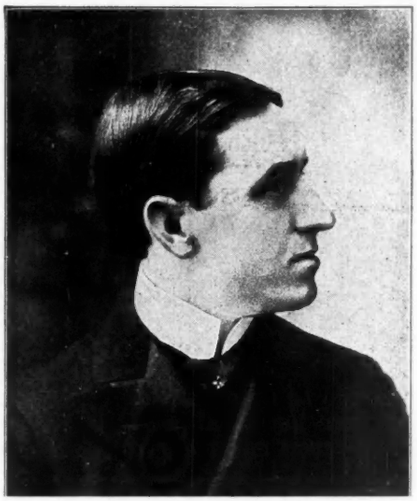
Judging from the three volumes which have already appeared, the work is one of high value and occupies a field peculiar to itself. There are a number of books dealing with the theory and practice of telephony, but from the engineering standpoint little has been written. The writer has worked in this case with special reference to the economic features—the question of how to install the best plant for the least money.

## LINDSLEY BROTHERS COMPANY, CHICAGO.

George L. Lindsley, president of Lindsley Brothers Company, embarked in the cedar pole business in 1884 as buyer for the Wisconsin Central Railroad Company. In 1893 he

GEORGE L. LINDSLEY.

engaged in the pole business for himself and in 1894, with his brother, E. O. Lindsley, formed the firm of Lindsley Brothers, which in 1899 was incorporated under the name of Lindsley Brothers Company, with a capital of $50,000. In 1901 the Lindsley brothers incorporated the Lindsley Brothers Company of Spokane and Portland to handle the company's Western cedar business, taking into the company C. P. Lindsley, who is vice-president and manager of the West-



E. A. LINDSLEY.

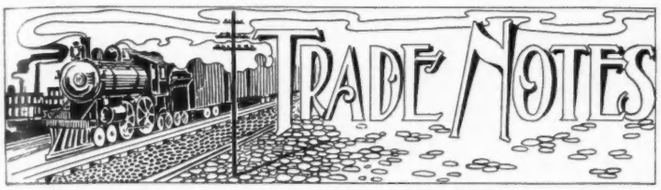
ern offices with headquarters at Spokane. The company owns twenty thousand acres of timber and are among the largest cedar pole producers in the United States, having an investment of over $200,000. The long Idaho poles were first introduced in the East by the Lindsley brothers in 1900, when they sold their first consignment to the Erie Telephone & Telegraph Company.

George L. Lindsley, the company's president, was born in Neenah, Wis., forty-five years ago. He received a common school education and is a graduate of the school of experience. He lived in a farm in Missouri until twenty-one years of age, when he went with the Wisconsin Central. He is a man of strong personality and his success has been deserved.

E. A. Lindsley, secretary and treasurer of the company, was born in Missouri thirty-two years ago and was in the hardware business in Menominee, Mich., prior to joining forces with his brothers.

C. P. Lindsley, vice-president of the company, was born in Neenah, Wis., thirty-five years ago, and spent considerable time in the boot and shoe business, after which he became associated with the Lindsley Brothers Company, which was founded by George L. Lindsley. All three brothers are practical men in their line and have worked incessently to build up the present large and lucrative business which the company enjoys.

A direct current arc lamp, when connected up in shunt with a telephone transmitter, will reproduce speech, the lamp in this case being termed a "speaking arc," or "archophone." The alternating current arc has not thus far been found adaptable to this use. One of the theories offered to explain the cause of these sounds issuing from the arc is that the slight variations of current set up by the transmitter produce relatively large variations of temperature varying as the square of the current. These variations in temperature in turn effect rapid variations in the volume of the carbon vapor, of which the arc is mainly composed, thereby setting up sound waves in the air around the arc. It has been suggested by Mr. R. A. L. Snyder that this discovery may be employed to enable a speaker to address large assemblies with comparatively little effort, inasmuch as the speech waves set up by the telephone transmitter could be superposed upon the field of an arc light machine, when all the lamps operated from this machine would reproduce the speech.




BELDING BROS. COMPANY, 118 Michigan street, Chicago, increased its capital stock the past month to $20,000.

THE MONARCH ELECTRIC AND WIRE COMPANY, Chicago, report a growing demand for telephone supplies, especially in wire of the Monarch brand.

THE DE VEAU TELEPHONE MANUFACTURING COMPANY has recently closed contracts for a number of important telephone systems, and has just shipped a complete equipment to Alaska.

THE SCOVILL MANUFACTURING COMPANY, 210 Lake street, Chicago, notes a satisfactory showing in increased orders from the telephone trade. Mr. Geo. B. Kerr is managing the company affairs.

THE PLUME AND ATWOOD MANUFACTURING COMPANY, Chicago, is enjoying an ever-increasing trade. "Snow Rod," the merits of which is well known to telephone men, is especially proving successful in meeting requirements.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, reports that the great increase in the number of rural telephone systems, most of which consist of party lines, is creating a brisk demand for its special bridging telephones.

THE VOUGHT-BERGER COMPANY, manufacturers of switchboards and telephones, LaCrosse, Wis., have just installed much new machinery, practically doubling the capacity of the plant. Other important improvements have also been made.

THE AMERICAN ELECTRIC TELEPHONE COMPANY, Chicago, has closed the contract for a switchboard of 6,000 capacity for the Fort Worth Telephone Company, Fort Worth, Tex. A number of the most important installations in the South are the work of this company.

THE TURNER BRASS WORKS, Chicago, presents a splendid argument favoring double jet gasoline torches in a pamphlet entitled "Double Hot Double Quick, or Double Jet Talk No. 1." A probable buyer will probably not be required to wait for "Talk No. 2" on the same subject.

THE CLARK AUTOMATIC SWITCHBOARD COMPANY, Providence, R. I., has recently supplied equipment for installations in the works of the Mathieson Alkali Works, Saltville, Va.; Atlas Portland Cement Company, Hannibal, Mo., and the Equitable Fire Insurance Company, Providence, R. I.

THE F. BISSELL COMPANY, Toledo, Ohio, has issued a booklet devoted to switchboards and specialties, besides being a catalogue of all articles used in telephone work and construction. Among other illustrations are photographs of a number of exchanges recently installed by the company.

THE STANDARD TELEPHONE AND ELECTRIC COMPANY, Madison, Wis., recently made a large shipment of long-distance telephones to Guatemala. The company reports its business of the last few months as the largest in its history. Its new style switchboard is said to be meeting with great favor.

THE STANDARD TELEPHONE AND ELECTRIC COMPANY, Madison, Wis., was represented at the convention by Jas. H. Parish, who declared that business was requiring the attention of an increased force to handle orders and that no attempt at making an exhibit of apparatus was contemplated in the face of such satisfactory conditions.

BAKER & COMPANY, Newark, N. J., is prepared to furnish practically any size platinum rivets for use as contact points in telephones and other electrical apparatus at a small increase in price above the market rate of the metal, and will be pleased to furnish upon request samples and prices of any style rivets or platinum in any form or for any purpose.

THE ELLIOTT-FISHER COMPANY, with main offices in New York and branch offices in Chicago, is a new company which has taken over the business formerly conducted by the Elliott & Hatch Book Typewriter Company and the Fisher Book Typewriter Company. The company makes a specialty of typewriters for telephone book work. The Chicago office is in charge of A. E. Burnett, superintendent of agencies, who will send upon request printed matter descriptive of the machines.

M. B. AUSTIN & Co., Chicago, dealers in electric supplies, have just issued their catalogue No. 12, which may be justly styled a monumental work. It is substantially bound in cloth, and contains 512 pages of most valuable reference material that will be of interest to the telephone trade as well as in the general electrical field. A telegraph code and an index of "trade words" is affixed to the body of the work and add greatly to its utility. Catalogue No. 12 is decidedly a production of permanent value.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, has recently closed contracts with seventeen telephone companies in the State of Iowa for their complete equipment. Indiana follows with 10, Nebraska 3, Wisconsin 3, Kansas 3, Illinois 2, Missouri 2, and New York, West Virginia, Arkansas, South Dakota and Idaho with one each. This list, which corresponds to a very short period of time, and includes only sales of complete equipment, speaks well for Swedish-American apparatus.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, has just installed an additional section of switchboard for the Independent system at Saratoga Springs, N. Y. The exchange was started a year ago with two sections of 2,400 line capacity, central energy, lamp signal multiple switchboard supplied by this company. This multiple switchboard system is the first of the International Company's make embodynig all of its improved features and new patents on this line of equipment, and is said to be one of the most modern, convenient and substantially constructed systems in use.

THE VARLEY DUPLEX MAGNET COMPANY, Phillipsdale, R. I., although it has made large additions to its facilities two or three times each year since taking up its present location, has constantly been behind with orders for magnets and coil windings. For the last six months the difficulty has been even greater than before, and less than half the orders presented have been booked. In order to meet these conditions the Varley company has just leased a large three-story factory building at Phillipsdale, containing 30,000 square feet of floor space. This factory is being equipped with a large amount of new machinery, and it is

announced that in a very short time all orders will be handled promptly.

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TANDEM "READY" REEL, see page 7 in TELEPHONY this issue, illustrates a development of "ready" reels for use in stringing telephone drops. This reel not only saves time and labor in stringing drops, but is actually a saver of material inasmuch as it keeps the two wires used in connecting up the pole line and a subscriber in perfect coils, free from kinks and waste. Tandem reels are made in two styles, No. 8 having a tension attachment which prevents the wire running out too fast, and No. 7 being the plain running reel. These tandem reels are used extensively in toll line work. For printed matter describing other styles of "Ready" reels and specialties, address your supply house, or the W. G. Nagel Electric Company, Toledo, Ohio.

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ENGRAVERS and printers are finding a most desirable class of customers in the telephone manufacturing business, judging from some of the recent catalogues. One of the exceptionally attractive late catalogues has been issued by the Eureka Electric Company, Genoa and Chicago, Ill. While not so large as some others that have been brought forth, none are more handsome than this one. Throughout the seventy pages is reflected a most painstaking observation to detail. Eureka apparatus should find many new customers from the distribution of this catalogue, which not only portrays the excellence of the manufactured product, but is a deserving memorial to the clever ability of its compiler, Mr. H. P. Didrickson, who has charge of the company's extensive advertising.

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THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY of Chicago, Ill., and Rochester, N. Y., has recently sold equipment to telephone companies as follows: Kearney Telephone Company, Kearney, Mo., 100-drop switchboard and 200 telephones; Deerfield Telephone Company, North Benton, Ohio; Clinton Telephone Company, Wilmington, Ohio, bridging telephones; Consolidated Telephone Company, Gridley, Ill., switchboard and equipment; Concord Telephone Company, Concord, Ill.; Farmers' Telephone Company, Perrysville, Ohio, 100-drop switchboard; Pixley-Dundas Telephone Company, Wakefield, Ill., switchboard and equipment; Lynn Center, Galva, Ill., telephones and construction material; Tri-County Telephone Company, Creston, Ill., switchboard, telephones and construction material.

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THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, N. Y., will shortly open the LeRoy Telephone Company's exchange at Le Roy. This exchange was built complete, and all apparatus furnished by the Century Company. The central station equipment consists of two hundred line, full common battery, electric-light line-signal switchboard, with double supervisory lamp signals. The power plant consists of storage batteries with the usual equipment of motor dynamos, switchboards and customary apparatus. This plant is one of the most complete and up-to-date telephone plants in the country. The Century Company has also just completed the plant of the Avon Telephone Company, Avon, N. Y. The outside construction is first-class and the central office equipment consists of a visual-target signal common battery switchboard with double supervisory visual-target signals, one of the Century company's latest productions.

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A GREAT DEAL of interest was aroused at the convention and favorable comments were made on the antiseptic gauze cups used by the Auditorium Hotel on telephone mouthpieces. The cup is a very simple affair of gauze, into which the chemical antiseptic solution is baked at high temperature and then pressed into such shape that it is instantly fitted to any telephone mouthpiece, no mechanical attachment being necessary. By some process known only to the manufacturers the medical properties are retained when the cup is exposed to the air until it comes in contact with the moisture of the breath, which excites chemical action, instantly destroying the foul odors and dangerous disease germs exhaled upon it. No scent is perceptible until one talks into the mouthpiece, when a slight odor of oil of cinnamon can be detected; an odor infinitely preferable to the accumulated stench of stale cigar smoke and the bacteria of various diseases found in telephones that are much used. The cup is the latest perfected device of preventive medicine and the eminent bacteriologists who have tested and indorse it say it is harmless to users, but that the most virulent germs coming in contact with it are immediately destroyed. Messrs. Libby & Company, 611 Cable building, Chicago, are the manufacturing agents and report a good and growing demand.

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THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Chicago, Ill., and Rochester, N. Y., is issuing expensive and elaborate catalogues in series under the rather unpretending titles of bulletins bearing consecutive numbers. Thus far three of these bulletins have appeared, which bear unmistakable evidence of being satisfactory educational documents. "Bulletin No. 1" is an exhaustive treatise on interurban telephones, illustrated and embellished and containing a vast amount of matter on this important branch of the telephone industry. "Bulletin No. 2" is a similar catalogue devoted to the bridging telephone and giving plans on how to organize, build and maintain a rural telephone system. "Some Advantages of Farm Telephones" and "Model Constitution and By-Laws," appearing elsewhere in TELEPHONY, are reproduced from this bulletin by kind permission of the Stromberg-Carlson Company. "Bulletin No. 3," while not quite as handsome as its predecessors, treats a subject equally as prominent and deals with it quite as thoroughly. This bulletin confines itself to "Telephone Construction Material and Supplies." What succeeding bulletins may have in store for the trade will be left with the company's aggressive advertising manager, F. L. Martin, who has set a high mark for competitors to emulate in the line of finished publicity.

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THE AUTOMATIC ELECTRIC COMPANY, Chicago, manufacturers of the Strowger automatic telephone equipment, reports an increasing demand for automatic telephone apparatus. It has recently sold to the Columbus Automatic Telephone Company, Columbus, Georgia, complete equipment for a present installation of 700 lines, the switchboard to have an ultimate capacity of 3,000. Among other orders recently received by the company are the following: One hundred station switchboard for the Mount Olive Telephone Company, Mount Olive, Illinois; 100 station switchboard to the Home Telephone Company, Birmingham, Alabama, to be located in a branch exchange and work in connection with the larger exchange of that company in Birmingham; 100 station switchboard to the Vermillion County Telephone Company, Danville, Illinois, to be located in a branch exchange and to be connected with the exchange in the city of Danville; 50 station switchboard to the United States Arsenal, Rock Island, Illinois; 40 station switchboard to the University of North Dakota, Grank Forks; 40 station switchboard to the Cape Railways Company, Cape Town, Africa, and 150 station switchboard to A. J. Perkins & Son, Medford, Wisconsin. The large exchange of six thousand station which the Automatic Electric Company is building for the Dayton Home Telephone Company of Dayton, Ohio, is rapidly nearing completion and it will only be a few weeks before the citizens of Dayton will have automatic telephone service.